COMPUTERWORLD

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NEWSPAPER

IBM, DEC Introductions Extend Options

• System/3 Line Gets Model 4

By Esther Surden
Of the CW Staff

ATLANTA – IBM's General Systems Division last week unwrapped a variety of products and system enhancements ranging from additions to its minicomputer lines to a system for data collection.

Announced were an entry-level model in the System/3 line and five submodels for the System/32 mini with increased disk storage. The division also introduced the 5230 data collection system that can perform tasks ranging from a standard time-recording operation to the collection of data that compares machine efficiency and sets standards.

The System/3 Model 4 was designed to control a group of terminal workstations, allowing data to be entered in user departments by non-DP personnel. This eliminates the need for traditional keypunching and card handling, according to IBM.

The workstation concept for the System/3 was prompted, IBM said, by a tremendous amount of user requests for a workstation model for this system.

The Model 4 executes up to four tasks or programs concurrently and can handle up to five visual display workstations. Printers can be substituted for the workstation units, IBM said.

A typical configuration includes a CPU with 64K bytes of Mosfet memory, a 5M- or 10M-byte disk storage and control unit, a 115 char./sec printer, an operator's display station and one to five video workstations.

Software available at no charge includes a basic System Control Program, a Multileaving Remote Job Entry/Workstation program that allows the Model 4 to use a workstation to submit operating system-level jobs to a 370 system and a Communications Control Program (CCP).

The optional software includes RPG-II, RPG-II Telecommunications Feature and Auto Report Feature, conversational utilities, disk sort and CCP/disk sort. None of the software is unique to the Model 4.

The addition of workstations to the System/3 line means a user can inquire of files at the same time that files are up-

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• Mid-Range Series Inaugurated

By Patrick Ward
Of the CW Staff

MARLBORO, Mass. – Digital Equipment Corp.'s Decsystem-2040 provides the performance of an IBM 370/145 for the price of a 370/115, the vendor said last week as it introduced the first model in a Decsystem-20 line of mid-range computers [CW, Nov. 19].

The 64K to 256K (36-bit word) virtual memory system can support concurrent time-sharing, batch and transaction processing for up to 64 terminal users, DEC said.

While the Decsystem-2040 fits into the same price range as IBM's 370/115, 370/125 and 370/135 and Univac's 90/30 and 90/60, DEC said the machine's price/performance is better than both the 370/145 and the 90/70.

IBM noted, however, that a 370/115 with the maximum 192K, two 3340 disk spindles, a 300 line/min printer, a 600 card/min reader and multiplexer channels costs $14,000 less than the minimum Decsystem-2040 configuration.

The Decsystem-2040 memory cycle time is 1.28 μsec. Up to four data words may be accessed by a single memory access.

This provides a memory bandwidth of more than 7.2 Mbyte/sec when four-way interleaved, DEC said.

Its price and performance makes the Decsystem-2040 a bridge machine between the Decsystem-10 line at the company's high end and the PDP-11 line of minicomputers.

Syntax Compatibility

The Cobol, Fortran, Basic, Algol and APL used on the Decsystem-10 and the Decsystem-2040 are 100% syntax-compatible, a spokesman said.

The two machines have somewhat different file structures, however, so some conversion work is necessary before disk packs can be exchanged between the two systems.

The Level IV Cobol available on the Decsystem-2040 supports Isam, high-performance sorting, simultaneous updating and DEC's DBMS 2040 data base management system, the vendor said.

Future releases of Decsystem-20 Basic will be fully compatible with Basic Plus, which has been the major language for PDP-11 users. This should provide upward software mobility for PDP-11 users, DEC said.

Front-End Integration

Unlike the Decsystem-10, the Decsystem-2040's CPU, core memory, controllers and a PDP-11 based front end are integrated into a single unit. This reduces the physical size of a Decsystem-2040

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Faulty Record Again Cited In Fla. Harassment Case

By Nancy French
Of the CW Staff

ORLANDO, Fla. – The Orange County Sheriff's Department blamed "human error" for a repeat of a "once-in-a-million" computer report which resulted in an innocent woman being ordered from her car at police gunpoint here recently.

Carolyn Russano said she and several friends were surrounded by police officers with drawn guns after a check of her license tag indicated her car was listed as stolen.

Russano had reported her auto stolen in August, but the car was recovered several hours later. Apparently, the information was never deleted from the computerized Florida Crime Information Center's (FCIC) stolen vehicle records.

"I was never so scared in my life, nor so humiliated," Russano said. "They held shotguns on me and my friends after they ordered us out of the car . . . If I had moved, I would have been shot."

In November, Frank Booth, a Brevard County official, was slain by a state trooper after the law officer received a false stolen-car report [CW, Dec. 10].

The trooper was exonerated in the shooting after testifying to a coroner's jury that Booth appeared to be reaching for a gun.

At that time Florida law enforcement officials called the inaccurate report a "once-in-a-million" occurrence.

Russano said she was driving to a restaurant near here to deliver some candles when a sheriff's deputy stopped her to ask why her car had no safety inspection sticker.

Russano said she explained the windshield had been damaged, the sticker destroyed and the windshield replaced. Since she had picked up the car from the

(Continued on Page 4)

NCR May Face Century 100 User In Courtroom Battle Next Month

By Molly Upton
Of the CW Staff

DEDHAM, Mass. – A suit filed by a former NCR Century 100 user requesting treble damages of $3.75 million from NCR may come to trial here next month.

The suit, charging NCR with breach of contract and warranty, fraud and negligent design and manufacture of the system, was originally filed in 1971 in Norfolk County Superior Court by James Ferrara & Sons, Inc., a food wholesaler doing business as First United Supermarket Service.

NCR, in its reply to the court, denied all charges, admitting only that it had entered into an agreement with Ferrara for the sale of a Century 100.

An NCR spokesman said that firm is proceeding with an active defense against Ferrara's charges. NCR attorneys indicated further comment would, in their opinion, not be appropriate, the spokesman said.

NCR announced the Century 100 in March 1968. First deliveries were made that fall, he said.

According to Ferrara, the firm agreed on May 16, 1968 to purchase a 16K Century 100 with a paper tape reader, printer and an 8M-character disk drive.

At that time, Ferrara said, NCR indicated the system would be delivered and fully programmed by January 1969, at least to the extent that it would include an NCR package for billing and accounts receivable.

Ferrara said it relied on NCR's skill and judgment to select or furnish a suitable computer for its present and future business needs, which it explained to NCR.

It listed those as accounts receivable and payable, billing, payroll and inventory control as well as future requirements dictated by expansion.

However, the computer was not suitable, and furthermore was not merchantable, as NCR had promised it would be, Ferrara's brief charged.

Later, NCR said a card reader, an additional 16K memory and the "installation of completely new hardware would satisfy all of plainftiff's said business requirements," according to Ferrara's complaint.

These representations were false, and NCR either knew or could have known of their falsity, according to the claim.

NCR "carelessly and negligently misrepresented" to Ferrara that the system was "programmed, documented, ready for implementation and would satisfy all"

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U.S. vs. IBM 'Gag Rule' Lifted

By Edith Holmes
Of the CW Staff

NEW YORK – The "gag rule" instituted in the U.S. vs. IBM antitrust trial was lifted here last week but the judge, the Department of Justice and the corporation have expressed strong preferences for a status quo in their communications about the trial and its issues with the press and public.

Judge David N. Edelstein, who is hearing the case without a jury, vacated Pretrial Order 4 in answer to a motion from IBM that restrictions limiting communication with those not directly involved in the suit be dropped.

IBM requested the order be vacated last October [CW, Oct. 22] and the government agreed, stating that to let it stand would be to allow it "to become the source of the very kind of distracting claims and proceedings that . . . it was designed to forestall."

The order was originally requested by IBM and assented to by the government. It has been in effect since mid-October of 1972.

In writing the memorandum accompanying his decision, Edelstein told the government and IBM "this court does not look with favor upon attempts by parties to release themselves from obligations which they have sought, have voluntarily undertaken and have benefited from for a long period of time.

"Nevertheless the parties agree that the order should be vacated at this time, and the court sees no point in further belaboring this matter."

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In NRMA Keynote Address

NCR Head Urges UVM Implementation

By Toni Wiseman
Of the CW Staff

NEW YORK – A vigorous effort by general merchandise retailers, merchandise manufacturers and retail equipment suppliers to implement the Universal Vendor Marking (UVM) standard was urged by William S. Anderson in his keynote address to the National Retail Merchants Association (NRMA) conference here last week.

Anderson, chairman and president of NCR, made the same plea three months ago but said he was repeating himself because "a new standard remains meaningless until it is actually implemented."

NRMA has adopted an OCR-A marking standard for the UVM, which is the retailing industry's equivalent of the food industry's Universal Product Code.

"There are compelling reasons which cause the equipment manufacturer to support the new universal standard," Anderson said.

It is a standard chosen and promoted by NRMA rather than by a single equipment manufacturer; hence it is a standard which we can all support.

"The fact that it is human-readable as well as machine-readable offers both internal system benefits and external customer benefits," he said.

"It is a standard which can be printed by relatively inexpensive printing mechanisms of many different types. Thus, it can be implemented at less cost than systems based on print/punch, bar codes or magnetic codes," he noted.

Finally, he said, "it can be used with virtually any retail medium including credit cards, invoices and other control documents."

While some might consider equipment manufacturers' endorsement of the UVM paradoxical because many have developed their own proprietary systems for merchandise marking, "in actual fact, no paradox exists."

"With an industry-wide standard, the equipment supplier no longer has to manufacture hardware capable of supporting different system approaches. The software problem is also simplified," Anderson said.

From the retailers' standpoint, the OCR-A scanning will give the merchant a powerful new tool for achieving inventory control at the unit level rather than the dollar level, thereby helping to improve return on inventory investment.

"In short, UVM will reinforce the basic mission of all retail organizations – that is, buying and selling merchandise more efficiently and thus more profitably," Anderson stated.

The consumer will also benefit through new levels of shopping convenience, time-savings and greater protection against error, as well as a reduction in out-of-stock situations, he added.

The standard has been established, but major challenges remain, Anderson told the conference attendees.

For the equipment manufacturer, there is a need to acquire additional experience with the new NRMA standard by installing working systems in a variety of retail environments.

Decsystem-20's Initial Offering Boasts Performance of 370/145

(Continued from Page 1)

configuration and lowers its cost, DEC said.

The PDP-11 front end handles the Decsystem-2040's unit record peripherals, console operations and terminal communications. It also serves as a local or remote diagnostic computer that can identify any marginal or failed board in the system, DEC said.

"It can be used to perform all the checks the maintenance engineer could perform if he had access to the machine," a DEC spokesman said.

Use of the PDP-11 could lead to a faster mean time to repair. Eventually it might help to hold down the cost of system maintenance, DEC said.

Users can run the Decsystem-2040 unattended, eliminating the need for an operations staff, DEC said. Should a crash occur, pressing the restart switch will automatically bootstrap the system to restart operations, the spokesman added.

DEC developed the Decsystem-2040's Tops-20 operating system from a combination of the Tenex operating system used on Decsystem-10s in the Arpa network and the commercial software offered on the Decsystem-10. Tops-20 is therefore a proven operating system, DEC said.

All of the operating system's facilities are available both interactively and via the batch system.

The minimum Decsystem-2040 configuration costs $250,000, and includes the KL20/PDP-11 processor pair with 64K (36-bit words) on the KL20 and 32K (16-bit words) on the PDP-11.

Peripherals include a 100M-byte disk drive and a 75 in./sec, 1,600 bit/in. tape unit on the KL20, eight communications lines on the PDP-11 and an LA36 keyboard printer.

The configuration is expandable to a $400,000 system with 256K words of memory, eight disk drives, eight tape drives and 64 communications lines.

Five- and seven-year full-payout leases will be available.

DEC will deliver the first Decsystem-2040 system in February to Boston City Hospital. The next delivery, in March, will be to Marshall's Department Store in Woburn, Mass.

DEC expects to be producing one Decsystem-2040 daily by the end of the year, the spokesman said.

DEC is at 200 Forest St., Marlboro, Mass. 01752.

Workshop Broadens CW Seminar

NEWTON, Mass. – Attendees of *Computerworld's* seminar on "Performance Evaluation and Improvement" will be greeted by a broadened curriculum when the seminar is held in New York City on Feb. 9-10.

The seminar now includes a Monday evening workshop in which technical problems will be discussed by attendees and the course leader, consultant Saul Stimler.

Cost for the two-day seminar at the Summit Hotel is $250, which covers materials, luncheons and continental breakfasts. There is no additional fee for the evening workshop.

Information on the seminar is available from the *Computerworld* EDP Seminar Series, 797 Washington St., Newton, Mass. 02160.

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Faulty Record Again Blamed in Fla. Harassment Case

(Continued from Page 1)

repair shop on a Saturday, she was unable to get a new inspection sticker.

The officer let her go, she said, but followed her as she drove away.

After receiving the stolen-car report, the officer called for city police reinforcements, who converged on Russano in the restaurant parking lot and surrounded the auto with their guns drawn.

According to Orlando Police Capt. Ed Paden, the officers were following correct procedures when they drew their guns. "Caution is the watchword" in checking out a stolen car, he said.

Sergeant Don Lane of the Orange County Sheriff's Department said there is no way to determine the exact reason for the record's not being purged from the FCIC stolen-property files once the car was recovered, since the records for August had already been destroyed.

Like many law enforcement agencies, the Orange County Sheriff's Department tape records its radio transmissions rather than maintaining radio logs, and these tapes are routinely reused after 30 days.

A Lot of Confusion

"There was a lot of confusion on the night Russano's auto was stolen," Lane explained, adding, however, that he was "not trying to make excuses."

About 11:45 p.m. on Aug. 21, the Florida Highway Patrol reported a hit-and-run accident about three blocks from Russano's home. Twenty-five minutes later, Russano called the sheriff's department to report her car had been stolen.

A road officer for the sheriff's department was dispatched, arriving at her home 20 minutes later. The officer took Russano's preliminary report on the vehicle and entered the report in FCIC and National Crime Information Center files.

In the teletypewriter department, the messages were filed manually as usual.

In the meantime, highway patrol officers found the automobile in a church parking lot two blocks away and impounded it because of its apparent involvement in the hit-and-run accident reported earlier.

Possible Reasons

Lane theorized that the record was never deleted for one of four reasons:

- The sheriff's patrol officer left it to the highway patrol officer sharing responsibility in the case to cancel it.
- The patrol officer failed to tell the teletypewriter department that the vehicle had been recovered, although the highway patrol had impounded it because of its involvement in a hit-and-run accident during the time it was reported missing.
- The patrol officer reported the recovery to the dispatcher who may have offered to forward the information to the teletypewriter department located in another room and then may have failed to do so.
- The teletypewriter officer may have been advised to cancel, but the system may have been down or the operator may have been doing something else, postponed doing it and then lost the message.

Since the record was never ordered canceled, it was not out of order for it to appear on the list of some 300 stolen automobiles included in the quarterly validation report – a record dump of all records entered into FCIC by that agency, Lane explained.

New Review Procedure

However, a new file-review procedure will be implemented at the sheriff's department to avoid such a problem in the future.

All stolen vehicles, stolen registration tags and missing persons, the three largest files, will be reviewed every 30 or 60 days, according to Lane – the frequency is still to be decided.

All complainants will be contacted by phone to update the status of each report. If a complainant cannot be reached by phone, he will be notified by form letter with an enclosed post-paid postal card and be asked to reply.

If a complianant does not respond, the record will be refiled without update. If the complainant cannot be reached after the second review, the record will be purged from the manual as well as the FCIC system.

"Had this procedure been in effect last summer we would have caught this problem in September or at least October," he said.

"We realize a few missing cars and maybe a person or two will be purged prematurely this way, but we're hoping to eliminate situations where we've got police officers pointing guns at innocent citizens," he said.

No Decision on Purging

TALLAHASSEE, Fla. – Users of this state's criminal justice information system met here last week to discuss whether stolen vehicles should be purged from the system after their license tags have expired.

The users met in the wake of an incident in which an innocent man was slain by a state trooper who believed the man was operating a stolen vehicle [CW, Jan. 12] and another in which an innocent woman was stopped and held at gunpoint for the same reason (see accompanying story).

In both cases, law enforcement officers had checked the license numbers against the Florida Crime Information Center's (FCIC) stolen-property file before acting.

Bob Edwards, director of Florida's Law Enforcement Data Center, reported users could not agree on whether the old records did more harm than good and postponed a final purge/no purge decision until they could review management statistics on the system.

"We want to know how many cars are actually found by old plates – just how useful these records are before they are destroyed," he explained.

However, users did agree more stress should be placed on training employees to use the system more effectively, and they initiated three new procedures:

- Provide additional training for dispatch personnel.
- Begin a regular newsletter for all FCIC users, the first issue of which would be used to review the two recent cases to illustrate soft points in the man/machine link.
- Require local law enforcement agencies to review and certify in writing that all stolen-property records included in the quarterly validation reports have been reviewed and that they are correct.

Judge Grants IBM Motion, Lifts 'Gag Rule'

(Continued from Page 1)

The judge also indicated he had not been persuaded by IBM's arguments on several occasions that the government had violated the order – particularly through the work of the Computer Industry Association, an organization of some 35 companies in various areas of the computer industry which advocates IBM's breakup and which IBM claimed has been employed by the Department of Justice as a consultant in this case.

Setting aside the fact that both sides claimed Pretrial Order 4 to be unconstitutional, Edelstein noted attorneys for the government and the corporation would continue "to be bound by the provisions of the Code of Professional Responsibility," which limits what lawyers can say to the press.

The IBM motion was then granted "with the admonition that the court will not hesitate to invoke disciplinary sanctions if necessary."

Asked what effect he believes the end to the gag rule will have, lead government counsel Raymond M. Carlson said, "the long speech I was going to deliver on the matter of Pretrial Order No. 4 amounts to 'no comment.'

"I and my staff will continue to maintain that position. I don't believe there is any other course for a government attorney to take," he added.

Similarly, IBM's legal leader, Thomas D. Barr, said he hoped things would "stay the same. I've never talked about a case and I don't intend to start now.

"When an attorney on the other side starts to comment outside the courtroom, then maybe it's time to fight fire with fire. But that's not the case here," he said.

Barr did add he and IBM are now in a position to comment when anyone wants to debate the fact that the corporation's present lead in-house counsel, Nicholas deB. Katzenbach, was Attorney General of the U.S. at the time the government suit against IBM was filed.

To the extent that IBM and the judge have called Pretrial Order 4 "an order of truth . . . not an order of suppression or an order of censorship or a gag order," court observers believe the absence of the rule will have little effect on the quality and quantity of information presently available from the principal participants in the trial.

Other "orders" or "rules" beyond any gag rule and the code of Professional Responsibility will, however, continue to operate in this trial.

As he stepped off the stand last week after over seven days in the witness box and with another day of testimony ahead of him, John J. Hangen, vice-president of NCR Corp., suggested he wouldn't expect anyone to put into print some of the four-letter words of which he was thinking.

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CW01196

Data Collection Unit Also Unveiled

IBM Extends System/3 Line With Addition of Model 4

(Continued from Page 1)

dated and data entered in either batch or direct mode, IBM said.

A typical Model 4 with two workstations will rent for $1,706/mo with a 5M-byte disk unit and $1,861/mo with a 10M-byte disk. Purchase prices are $50,540 and $54,460 respectively.

The model is also available on a 36-month lease at $1,610- to $1,741/mo depending on the disk chosen.

The Model 4 will be available in June, IBM said.

More Disk Storage

The five additional submodels for the System/32 were designed to allow users to take advantage of increased disk storage for the mini.

Users now have the choice of models with either 5M-, 9.1M- or 13.7M bytes of disk storage. Access time and data rates for the 9.1M-byte and 13.7M-byte disks are identical.

The five submodels equipped with the 13.7M-byte disk and printers from 40 char./sec to 155 line/min will cost from $39,530 to $44,410. Rental prices will be $990- to $1,242/mo; users who wish the 36-month lease plan will pay from $943- to $1,183/mo.

Other System/32 enhancements include:

- The addition for all models of punched card input and output capabilities.

The System/32 can be connected via the announced options to either an 80- or 96-column card data recorder, the firm said.

The card capability, which will be available in November, will allow the system to handle the 5230 data collection system as well as remote job entry and other card applications.

- An Industry Application Program (IAP) called Data Collection System Support which allows the System/32 to read data collected by the 5230 system, prepare turnaround media cards for use in the shop and provide appropriate management reports.

This IAP may also be used with the earlier Manufacturing Management Accounting System IAP, IBM siad.

The Data Collection System Support will be available in June at an initial charge of $500 and a monthly license charge of $26.

- An IAP for lumber and building materials wholesalers and retailers which produces cost estimates for contractors and builders.

Standard invoicing programs will produce estimates which can include tearoff strips showing cost profit by item.

This IAP will be available in March at an initial charge of $3,120 and a monthly license charge of $147.

Data Collection System

Dubbed a "simple, easy to use, low-cost data collection system," the IBM 5230 data collection system was designed to provide the user with current information on orders; identify processors or machines operating at less than peak efficiency; reduce paperwork and clerical errors; and provide the information needed for material planning and controlling inventory investment, IBM said.

Information collected by the 5230 can be processed on IBM System/32 or System/3 via the Data Collection System Support IAP. Collected data can be processed directly on a system capable of reading 80- or 96-column punched cards or IBM diskettes. The data can also be sent to a remote system through a telephone link.

Designed for on-the-job entry by workers entering information on cards, each station can handle up to eight customer-defined transactions. A user can personalize the system to fit his particular needs by completing fill-in-the-blank forms, IBM said.

Timestations in which time-in and time-out is recorded for each employee are also available.

Production quantities and times, incoming and outgoing shipments, job progress, inspection results, inventory and tool usage and billing data are examples of information that could be entered into the system, IBM said.

As many as 15 stations, either data or time, can be connected to the system, IBM said. Typical configurations range in price from $445- to $1,765/month and can be purchased for $16,000 to $58,000 depending on the number of stations. First shipments will be in June.

NCR May Face Century 100 User In Mass. Courtroom Next Month

(Continued from Page 1)

of Ferrara's business requirements, the brief continued.

Further, the complain charged, NCR said it would repair and maintain the equipment in a fast and efficient manner.

NCR, according to Ferrara, breached its warranty that for three months from the date of system certification it would keep the equipment in good working order and make all necessary adjustments, repairs and parts replacements.

NCR also warranted the equipment to be free from manufacturing defects in workmanship and materials under normal use, according to Ferrara.

In addition, another count alleged the system was "negligently manufactured and/or designed and/or installed at plaintiff's premises in an unsafe, unsuitable and defective condition" because of negligence on NCR's part.

NCR's promises about delivering an operable system "were false, misleading and deceptive and were made for the purpose of inducing plaintiff to purchase the computer system," Ferrara charged.

Additionally, NCR failed to warn Ferrara the machine was in an unsafe, unsuitable and defective condition, as it was obligated to do, the brief said.

Ferrara, in assessing its claim of $1.25 million plus interest and costs, cited numerous interruptions in its business operations, lost customers and the loss and expense incurred, including loss of profits.

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In Six-State Experiment

Funds for Needy Invested in Automating Applications

By Catherine Arnst
Of the CW Staff

DENVER – Money appropriated by Congress for emergency care of the sick and hungry is being used here to fund a six-state experiment to computerize the application process for persons seeking public assistance.

A Community Services Administration (CSA) director defended this use of funds taken from the Emergency Food and Medical Services (EFMS) program as a more effective, although indirect, use of taxpayers' money which would result in the needy getting long-range aid.

Comparing the emergency funds to a bushel of corn, David Vanderburgh said his agency's options were to either "plant the corn or give it away as food. We chose to plant this particular bushel."

The field being planted is the Single-Purpose Application with Automatic Referral System (Spaars), which Vanderburgh hopes will reduce the amount of red tape an applicant must wade through before he can receive assistance.

Normally an applicant must fill out a separate form for each type of aid desired, often duplicating the same information.

"There is a tremendous amount of time wasted by agencies dealing with low-income people," according to Richard Swenson, a community resource specialist with CSA. "If information on an applicant is gathered once, why can't it be sent to other agencies?"

Under Spaars, an applicant fills out one form with information required by all welfare agencies. This information is then analyzed, preferably by a computer, to determine the types of aid for which the applicant is eligible.

The results are then sent to the appropriate agencies in the form of a hard-copy printout and the applicant is also informed.

Denver's CSA proposed Spaar to the six states in its region (Montana, Wyoming, Utah, Colorado, North Dakota and South Dakota), but left the design up to the individual states so it would be compatible with their own DP operations.

North and South Dakota and Utah are already designing computerized systems while the other three states are still in the planning stages.

"We're excited as heck about Spaars and think it is working very well," Swenson said. North Dakota has already taken 128 pages of forms and boiled them down to one page with an accuracy rate of 95% in determining aid eligibility, he added.

In South Dakota, a human service simulator has been set up to determine how much money and time can be saved through shared use of data. A toll-free telephone line has been instituted over which state residents can call to get rapid responses to their queries on eligibility.

All the states will run the system on existing hardware and the average cost per state of designing and setting up a system will be $80,000, Swenson estimated. CSA has already provided $800,000 in financing from the EFMS, which has a fund of between $1.2 million and $1.5 million.

Spaars is now being phased into state operation and will be completely funded by the individual states by June.

Legitimate Use

Spaars is a legitimate use of the EFMS funds, according to Vanderburgh, who stressed he has full support from his superiors in Washington.

"This is not something we jumped into; it is thoroughly consistent with our guidelines," he said.

The conflict in spending emergency funds on a project such as Spaars resulted from an opinion filed by an Office of Economic Opportunity (OEO) lawyer in November 1974 stating the emergency money "is appropriated to deal with what Congress found to be a continuance of pockets of immediate nutritional and medical needs.

"Its funds ought to be expended for that purpose," the opinion stated, noting the money was not earmarked to create any organizations.

The *Rocky Mountain News*, a Denver paper, charged "computers only occasionally can be expected to help a hungry person get food" and financing Spaars with the EFMS funds was a "clearly expansive interpretation of the law."

That was a "sensational way of putting it," Vanderburgh said, adding that CSA agencies around the nation have been spending EFMS money under broad interpretations of the law.

"We don't feel we're ignoring the law any more than any other CSA agency. We could go out and buy hot meals and feed them to people; whether or not they would go to the right people, we don't know," he said.

Vanderburgh would rather see reform and improvement of aid programs which would help the needy by speeding aid to them through a more efficient application procedure. He plans to continue funding Spaars with the emergency money until he gets different instructions from his superiors in Washington.

Washington, however, is enthusiastic about Spaars, with both OEO and General Accounting Office expressing an interest in studying it, Vanderburgh said.

But skepticism concerning the system was expressed by Mike Zainhofski, Spaars Project Director in North Dakota.

Although he acknowledged the potential for savings through Spaars, "federal regulations will have to be dealt with first."

Stringent regulations involving economic assistance programs will hold up any streamlining of the application process, he said; the form his state has designed already includes adjustments to accommodate all the various regulations that inhibit the effectiveness of any automated system.

Zainhofski is hopeful these bureaucratic boondoggles can be reduced to a minimum, but is not confident that it will happen in the next few years.

"We are dealing with old-line agencies that are very institutionalized," he said, and in his personal opinion any changes that may come about will be gradual.

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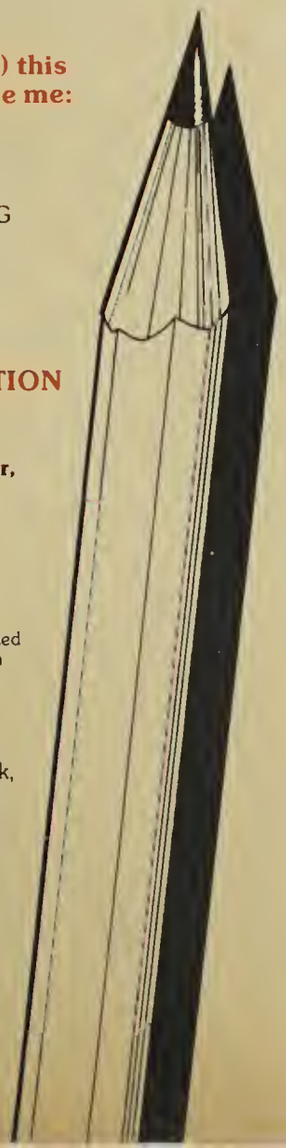

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Lockheed Electronics

The Lockheed System III family of small business computers will be featured at their Computer Caravan/76 exhibit. The disk-based systems are RPG II compatible and support up to eight on-line local/remote terminals with the Multi User Operating Systems. Dual programming capabilities displaying instantaneous data inquiry and retrieval, will be demonstrated during exposition hours.

TEXAS INSTRUMENTS
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Texas Instruments will display and demonstrate models of their 990 Family of micro/minicomputers, as well as models of their Silent 700* Electronic Data Terminal Family.

*Trademark of Texas Instruments.

ANDERSON JACOBSON

ANDERSON JACOBSON, the country's first manufacturer of acoustic couplers and modems, also offers data communications terminals including Teletypes, the AJ 841 Selectronic TM terminal, the AJ 630 wide-carriage non-impact terminal, and the new AJ 832 keyboard printer terminal.

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HP features the new 2644A Terminal (mini-data station) with twin-cartridge, integrated local mass storage. HP is also featuring the new MX/65 DISComputer, a powerful 21MX minicomputer and ultra fast 12962A disc subsystem. It's rugged, reliable – and the lowest-priced computer/disc team available from one manufacturer.

GENERAL AUTOMATION

A new family of advanced technology micro- and minicomputer systems – The Solution TM Series – will be displayed. Their use in data communications & data management applications will be demonstrated.

Consolidated Computer

"CONSOLIDATED COMPUTER will be displaying the new KEY-EDIT 60 key-to-disk system for small to medium sized users. More than a data entry system, KEY-EDIT 60 has powerful editing, processing and communications features to help distribute the data processing workload."

BEEHIVE TERMINALS

Beehive Terminals Super Bee 2, in a rack mount configuration, and the text-editing Edit Bee will join other Beehive video display terminals at Computer Caravan. Beehive Terminals will also feature its new user programmable "video computer" Brilliant Bee, and make a product announcement at Caravan time.

Events in Past Year Prove DP Crime Can Be Profitable

By Ann Dooley
Of the CW Staff

The growing number of white-collar criminals might give evidence (if they were willing to, which is doubtful) that "crime does pay."

It is impossible to determine how many computer fraud crimes have occurred or are occurring in 1975. Little or no security, the fact that no system is totally secure, the unlikelihood of prosecution and the light sentences make computer fraud look like a worthwhile business.

In 1974, an estimated 339 computer-related frauds occurred, with an average loss of over $500,000 and a total loss of over $200 million. The odds of going to jail for a white-collar crime are 33:1, even if the person is caught, according to Dr. Ted Linden of the National Bureau of Standards.

Of the computer-related fraud cases, 85% were not even reported to the police, Linden said, quoting figures from a report issued by Robert Courtney of IBM.

White-collar crime is looked upon in such a favorable light that Jerry Schneider, one of the most well-known computer-fraud criminals and the person who in 1972 cracked Pacific Telephones' computerized access inventory system, received less than a year sentence and was recently written up in *People* magazine as a success story.

"More and more white-collar crimes are associated with computers because the data which would constitute such a crime is stored in computers," Donn B. Parker, an expert on computer fraud at the Stanford Research Institute, said.

Public Awareness Increasing

The public awareness of computer fraud as a serious problem has increased in the past year because more cases are being discovered. Unfortunately, the public, which has always been wary of computers, has often been misled by distortion and sensationalizing of the events, according to Parker.

Many of the reports of computer-related frauds have been blown out of proportion compared with the exotic methods used for other crime, Parker said.

Computer fraud is an easy label to place on something which is not actually fraud by computer. "The role of the computer is more of a unique environment in which these things happen than an exotic tool," Parker said.

Most fraud which occurred in the last year was done by individuals who used the computer facilities at their own company for profit.

Few used the computer for any more original kind of crimes; at least among those that have been discovered so far. The Equity Funding scandal of 1973 which brought computer fraud to the forefront has not been paralleled since.

A theft which occurred in Los Angeles this year is an example of a computer being an indirect means for fraud. Blank treasury checks, which the city's Data Services Bureau computer had printed, were stolen and forged. The amounts on the checks were found to have been printed manually and not by the computer.

Another such case occurred in Illinois when a caseworker, a terminal operator and two welfare recipients programmed the computer to print checks made out to phony recipients. The fraud went on for six months before it was discovered.

Getting Worse

The potential for computer fraud is getting much worse, Linden said. "The very acute stage for computer fraud is probably still coming in the future," he added.

A study by the Stanford Research Institute forecast that, unless countermeasures are implemented, computer fraud will go as high as $40 billion a year, although figures differ as to the amount.

This year, in response to the growing number of cases of computer-related

Historical Perspective

crimes, the Federal Bureau of Investigation (FBI) has provided some of its agents with special training in the area of DP and computer fraud. A special squad has been established to deal with such crimes.

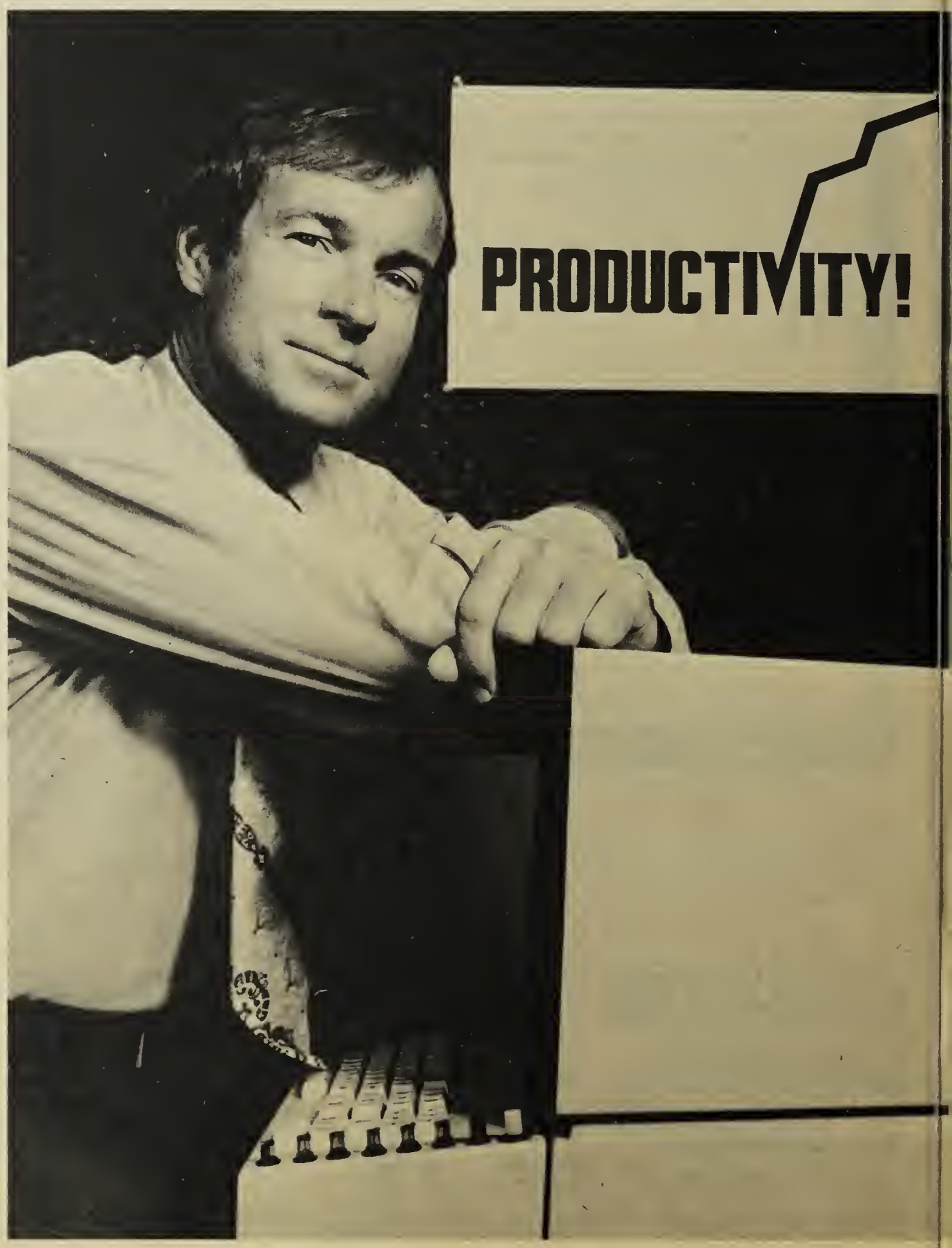
The number of cases went up rapidly in 1975, but whether this was because the authorities are getting better at detecting computer-related fraud or because the fradulent use of computers has flourished in proportion to the increase is something about which experts are not sure.

"Computers are like Swiss cheese, and much electronic thievery goes undetected," Parker said.

The distortion that has occurred over computer fraud is especially prevalent when it occurs within banking. With the use of electronic transfer of funds, "our negotiable assets become the tapes and disks" rather than cash and paper securities, Parker said.

"The crime remains the same, just the form of the assets is new. But with the movement of auditing professionals into computers, we're starting to see the detection of this crime," he added.

Voting fraud became a prominent battle cry in several elections throughout the year. It is a natural area for complaint since politicians have become dependent on new technology. They don't understand it and are edgy, Parker said.



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Call for Artists

NEW YORK – Budding computer artists will be given a forum for exhibiting their creations at the 1976 National Computer Conference here June 7-10.

Works in graphics, film, video tape, recorded sound, sculpture or any other medium are eligible, according to Jackie Potts, Computer Arts Committee chairman.

As part of the art show, an on-going silent auction of the works presented will be offered. Prospective buyers can bid from June 7-9 and on June 10 the highest bidders will purchase their selections.

To enter a work, a description of each piece of art, its size and method of production, the suggested selling price if it is to be sold and a facsimile of the art itself must be sent by Jan. 30 to Potts at 5681F Harpers Farm Rd., Columbia, Md. 21044.

Armer Named to Head Afips EFTS Group

MONTVALE, N.J. – Paul Armer of the Center for Advanced Study in the Behavioral Sciences has been named chairman of a special committee on electronic funds transfer systems (EFTS) formed by the American Federation of Information Processing Societies (Afips).

The establishment of the EFTS committee marked "a major commitment by the federation to assure that pertinent technological information is made available to the federal government and to other groups concerned with the increasing usage of automated transactions," Afips said.

It is expected to work in cooperation with Afips' Washington office to provide testimony and counsel on the use of computers and related communications techniques in all areas involving EFTS.

"We are disappointed," Afips said, "that the recently appointed National Commission on Electronic Funds Transfer does not include a representative from the information-processing community.

Societies/ User Groups

"It is our hope the Afips special committee can help fill what we believe to be a major void in assuring that various policymaking bodies have expert testimony at their disposal."

Armer succeeds Dr. Bernard A. Galler as chairman of the special committee. In addition to his activities at the Center for Advanced Studies, Armer is a lecturer in computer science at Stanford University and is a past president of Afips.

Auditors Plan Research Project To Specify Necessary Training

PHILADELPHIA – A project to define "A Common Body of Knowledge for EDP Auditing" has been commissioned by the EDP Auditors Association (EDPAA).

The association hopes to provide both "an identification of present and future DP auditors' responsibilities and a specification of necessary knowledge and training to effectively perform the identified tasks."

Dr. Martin Bariff of the Wharton School is chairman of the project and plans to survey present DP auditors, DP managers and users of auditing reports as a basis for the study.

Computer manufacturers will also be consulted for projections of computer technology in 15 years, he said.

Bariff hopes the project will establish "what really constitutes DP auditing" and the basis of education or experience required.

An important goal of the project will be to consider the development and implementation of a certification process for DP auditors, Bariff said. The national attention in the last few years on DP fraud has necessitated certification, he added.

The project committee, in addition to Bariff, will include four other members and there will be an advisory board of eight to 14 members, Bariff said. The committee is looking toward hardware manufacturers for funding and Bariff is confident it will get it.

A preliminary report will be issued in the fall. The deadline for the final report is spring 1977.

Calendar

Feb. 10-12, Andover, Mass. – **Data Entry Systems and Source Data Automation**, sponsored by the Institute for Graphic Communication, Inc. (IGC). Contact: Richard D. Murray, Director of Conferences, IGC, 375 Commonwealth Ave., Boston, Mass. 02115.

Feb. 10-12, Anaheim, Calif. – **1976 Association for Computing Machinery (ACM) Computer Science Conference**. Contact: ACM '75, P.O. Box 658, Hopkins, Minn. 55343.

Feb. 11-13, New Orleans – **Micrographics '76**, a winter symposium sponsored by the Society of Photographic Scientists and Engineers (SPSE). Contact: SPSE, 1330 Massachusetts Ave. N.W., Washington, D.C. 20005.

Feb. 11-13, Albuquerque, N.M. – **Workshop on Data Structures and Pattern Recognition**, sponsored by the IEEE Computer Society's Technical Committee on Machine Pattern Analysis. Contact: Prof. R.L. Kashyap, School of Electrical Engineering, Purdue University, West Lafayette, Ind. 47907.

Feb. 24-26, San Francisco – **Compcon Spring '76**, sponsored by the IEEE Computer Society. Contact: John E. Petersen, Compcon '76 Spring, IBM Corp., R62/123, 5600 Cottle Road, San Jose, Calif. 95193.

Feb. 26-27, Stanford, Calif. – **Strategies for Management of Computer Output**, sponsored by the National Micrographics Association and Stanford University. Contact: Prof. Vinton Cerf, ERL 230, Stanford University, Stanford, Calif. 94305.

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Editorial

Back to Sewing Machines

Singer has joined the list of major American corporations that have entered and then exited from the computer business [CW, Jan. 12], joining such well-known names as Bendix, Philco-Ford, General Electric, RCA and Xerox.

But the Singer exit is not in a class with those others and has less overall meaning to the wide range of computer users.

Singer, even though one of the country's largest corporations, never really made a commitment to a wide range of computer users, preferring to target specific areas of the business.

The firm suffered from poor management – in the computer area, at least – and a number of other factors that are peculiar to its place in the industry. Its departure did not indicate serious industry-wide problems as did the exit of other firms from the field.

Singer was the leader in the early race for the point-of-transaction terminal market and remained the leader in that market in terms of installations right up to the day it dropped out of the business.

But the retail industry, on which such business depends, has been hard hit by the recession of the past 1-1/2 years, drying up capital for such costly ventures.

The sheer cost of point-of-transaction systems also made many retailers defer plans for installations, hoping for price reductions that would make them more attractive on a price/performance basis.

Furthermore, Singer had a problem supplying stores with complete systems, since it could not offer large mainframes into which the retailers could tie their point-of-transaction terminals. So Singer got the terminal business, while someone else walked off with the central computer business and programming efforts.

In addition, Singer also targeted the small-systems market for a major effort with its Singer System Ten. But Singer never put in the effort necessary to provide programming to the typical small systems user, leaving that to local systems houses.

As competition increased – particularly from IBM with the System/32 and Industry Application Packages – Singer was hurt.

Even though nearly all vendors in the small-systems market depend on outside programming houses, most of the others give users more tools and often skeleton packages with which to work.

The demise of Singer's Business Machines Division pointed out once again that a company cannot get involved with DP if it has one hand tied behind its back.

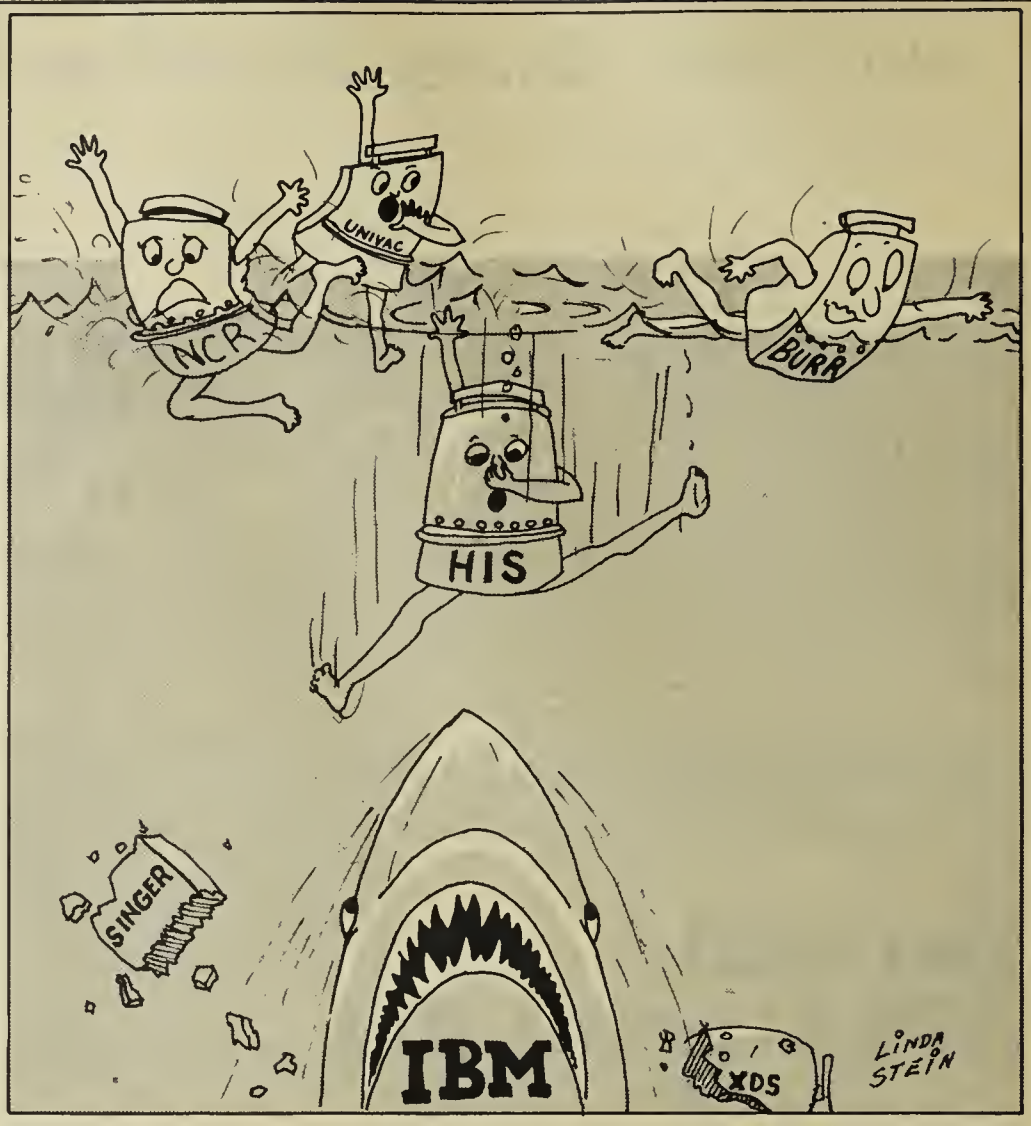
A company in the computer field has to make a total commitment, and it has to provide confidence and support to users as part of this package.

Whatever the real reasons why Singer left the mart, users are faced with another problem of who will pick up the pieces. Will installed equipment continue to be supported and, if so, by whom?

And as the industry continues to shrink, users become less prone to innovate. The cost of systems is going up and the list of companies is shrinking.

The DP industry is becoming a rich man's game that eventually may look like the Detroit automotive industry with only three or four viable contenders.

If that happens, users will have even less flexibility than they have today.



(From a Reader's Suggestion)

Letters to the Editor

Establishment of Jurisdiction First Question in AT&T Trial

The editorial in the Dec. 17 issue on the AT&T antitrust suit has done the telephone company and its lawyers an injustice.

The question of jurisdiction of a court to hear a matter is the first question that must be resolved in any litigation. If the court has no jurisdiction to decide the case, its decision is absolutely null and void, even though the case may have been tried and a verdict reached.

With an antitrust case of this magnitude, which is likely to go on for years to involve hundreds of depositions and months of trial and cost thousands of man-hours and perhaps millions of dollars in legal fees and expenses, it would be utterly stupid for either the government or the telephone company to proceed till the question of the court's jurisdiction has been settled.

As a taxpayer, as a user of telephone service and as a stockholder of the Bell System, I am very happy this question will be settled at the outset, rather than after a trial when the case is appealed.

Robert Bigelow

Boston, Mass.

A Case for Licensing

The Society of Certified Data Processors (SCDP) heartily concurred with the editorial, "A Needless Killing" [CW, Jan. 5].

The editorial, however, overlooked a point which is most obvious to us who are concerned with the social impact of information processing systems – the simple fact that, unless some dramatic steps are taken to establish mandatory systems standards and inspection processes, this incident is destined to repeat itself.

The DP community shouted loud and long last year regarding the SCDP's licensing proposal, without once coming to grips with the fact that, at the very least, the proposal, if taken in its entirety, might have prevented the "justifiable homicide" which occurred in Florida.

The simple fact is that this country, with its legal system based upon the English Common Law, must wait until the disadvantaged can claim recourse. But how can Frank Booth now claim recourse?

Can we be content that we may be able to stir the Florida Legislature to change the licensing system to preclude reoccurrence?

Yes, the situation is tragic. But the fact still remains that we are at a point in history where the public interest must demand to be protected, where the systems which affect life and limb are constructed with formalized and legal guidelines and where inspection procedures are invoked to protect that interest.

We believe that *Computerworld*, the remainder of the DP trade press and the DP professional groups have a responsibility not only to speak out in behalf of such procedures, but to begin the steps necessary to bring about the legal codes necessary to mitigate, if not preclude, repetition of such needless disadvantage.

Kenniston W. Lord Jr.
President

SCDP
Hudson, Mass.

How to Volunteer for EFTS Work

I agreed with the Dec. 10 editorial regarding the National Commission on Electronics Funds Transfer (EFTS). CW's call for volunteers to help on special task groups makes sense.

However, please go one step further: suggest a way to volunteer. What is the address of ex-Congressman William B. Widnall?

Something as important in our future as EFTS deserves all the help it can get.

Bill Ashley

Kansas City, Mo.

Good idea. Widnall's address is Suite 900, 1000 Connecticut Ave. N.W., Washington, D.C. 20036. Ed.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Exports and Security

Most of these columns dissipate rather quickly and completely. Sometimes there is feedback about a detail of history or of grammar, but only occasionally do they generate interesting disagreement. I was surprised on a very recent Washington visit, therefore, to have strong exception taken to "Negative Exports" [CW, Dec. 17]. And a day or so later I read of Senator Byrd's comments, calling for a practically complete moratorium on computer sales to the U.S.S.R.

Obviously I have missed some clue, some political insight. Peculiar forces on the Hill, or in the Pentagon, are at work. What could they be? Why is Fred Bucy of Texas Instruments socking it to the Nato Coordinating Committee? Big puzzle! I would appreciate speculation, interpretation or some inside information from readers, and will of course respect any confidences involved.

Thing is, the Soviets obviously *have* access to enough computer power to do their high priority military tasks. Everyone in our trade worldwide, from Novaya Zemlya to New Zealand, knows that it is impossible to design a hydrogen bomb or stage a space spectacular without computers. And old-timers, at least, remember that the U.S. and the British, and I suppose the French – although they had late access to some pretty fancy CDC and IBM equipment – did their first and most important nuclear and aerodynamic and astronautical calculations on pretty primitive first generation and pre-electronic equipment. Los Alamos, disguised as a Santa Fe post office box, and satellites such as the Watson lab at Columbia were using IBM 601 calculating punches (600 multiplications, not per second or per millisecond, but per *hour*) to do shock wave partial differential equation calculations in 1945! The installation was run by Nick Metropolis and Stan Frankel, I remember, and had something like eight of the black horrors; I had six, in New York. And aside from petulantly throwing output cards on the floor if not soothingly attended, they ground away day and night: one time step (a millisecond, I think) per eight hour shift.

And, to come back to modern times, we are virtually certain the mainland Chinese have no hotshot equipment and had even less a decade ago. Yet they too have designed and fired a fusion weapon. The point is, if you surround a punched card machine, a relay calculator, a primitive differential analyzer, a pre-Ryad hand-wired Russian machine, or a secret stolen 704 with really good people – with the Soviet equivalent of von Neumann, Teller, Bethe, Marshak and Feynman – you get nuclear weapons, and intercontinental missiles, and submarine reactors. Sure, more slowly and at greater cost than if you have Fernbach's supercomputer museum at your disposal. Sure, you may have to skimp lots of other "attractive" military applications. But you get the vital ones. We did. The British did. The Russians and the Chinese did.

Suppose the Intourist machine *was* diverted (part time, I'd suppose, since many Western intelligence types would be watching). Suppose it speeded up high-priority weapons design and astronautical and perhaps even cryptanalytic tasks. It could hardly do so by more than one or two per cent, given the research machines – largely American – subterraneously available, the old one-off Soviet machines and Minsk/Pinsk/Omsk precursors and the first cut of Ryads already at work, and the presumed economy of application long since abandoned in the American defense establishment.

And the Soviets already have – or at least, we are told by the same military and intelligence sources that object to computer exports that they have – enough weapons and weapon transports to destroy the Free World a hundred times over: *already* have! We, of course, have even more. Then for Heaven's sake, what advantage would a few fancy new American computers offer – what added deadlines?

Far more supportive of the Russian threat, it seems to me, although I'm certainly not an expert in military logistics or strategic planning, would be the release of enormous amounts of Soviet man and womanpower back in the agricultural bush, by the availability of U.S. and Canadian grain. Is wheat export fought by the Pentagon and the CIA, here or in NATO?

As for Fred Bucy, he's just plain old got rocks in his head. If Motorola, Fairchild, National Semi, and TI can't keep up with IBM (no 16K chips yet on the market, versus the innards of the mass-production 5100), and if Fujitsu and Hitachi and the new government-funded Japanese ELSI project are behind, and not noticeably narrowing the gap, how do Bucy and his Pentagon pals expect the clumsy Russians to do it?

No, there has to be something down inside that I don't understand. I could smell it when I was on the Commerce-sponsored advisory committee back in my NBS days; I sensed it lurking around the secretive doings of Tony Oettinger's ugly Academy of Sciences panel. There's a Nixon in the woodpile!

I'd like to see the whole thing aired. The big companies, IBM, CDC and Univac, really ought to insist as a public service that a major congressional inquiry be held. Of course, they have strong links themselves to the military-intelligence complex, and it's hard to bite Defense/CIA/NSA hands when they feed so lavishly. But would the computer giants really suffer? If the Pentagon got sore at all the big boys, where would it go? To Fred Bucy's hand-held TI's? To confused Honeywell? To DEC? I don't see how; the military needs its special suppliers in our trade more than *they* need *it*. I repeat, for the long-term health of our most wonderful industry, and to fly our proudest flag deep in enemy territory, let's find out what the problem really is.

Herb Grosch

AICPA Approach Could Provide Model for Standards

The approach taken toward Management Advisory Standards (MAS) by the American Institute of Certified Public Accounts (AICPA) has resulted in a codification of its ideas into 11 standards: three competence standards and eight practice standards. (See box.)

The Taylor Report
By
Alan Taylor, CDP

But standards, even when written with the broadest brush around, still need some explanation, so let's take a look at them one by one.

The first competence standard, requiring training and experience in the subject matter and in "analytical approach and process," both allows AICPA to get the certified public accountant (CPA) qualification in and also allows non-CPAs to claim equal or better qualifications.

The official gloss explains that an AICPA committee "believes that qualification as a CPA is a proper base on which to develop proficiency," and few will dispute this comment.

The explanation, however, goes on to require that, while specially trained people in non-financial fields (and most MAS work is in DP areas) may be used, management of such people through proper supervision and evaluation is necessary.

The second competence standard requires "an independence in mental attitude," which is apparently regarded as resulting in "an objective, unbiased and forthright point of view" being brought to the matter being considered.

An interesting concept, but one which really seems to be saying that if someone likes a particular computer, such a bias should be declared, so that the person reviewing the material can deal with a known quantity.

Malpractice Guards

The last competence standard, "Due professional care" doesn't reveal too much at first glance, and the committee explains it only indirectly. Its indirect way, however, is to quote from a legal textbook on liability. It describes someone who undertakes a job, while not having a degree of skill commonly possessed by others in the same employment, as committing "a species of fraud."

That's indirection with a sledge hammer. What this standard is saying is that malpractice suits can result from breaches of the standards.

The practices standards directly repeat the general competence standards, but this time the committee comes down to some specifics, even in the first standard – personal characteristics.

This is explained as "ensuring" that statements of findings and recommendations are free from misstatements and that the working method will be a fourfold one:

(1) Problem study.
(2) Information gathering.
(3) Consideration of alternatives.
(4) Statements of findings and recommendations.

Now, can you imagine how many words it would have taken one of the various DP societies to have come up with such a result? Many more than the 19 words in the personal-characteristics standard, I'll bet!

A similar analysis of the competence-practices standards comes up with a definition of competence in a similar table. Competence, according to the committee, is:

- Ability to identify and define needs.
- Ability to utilize the analytical approach and process.
- Ability to apply technical subject matter knowledge.
- Ability to effectively communicate recommendations.
- Ability to "assist" in implementing recommendations.

The due-care standard does not

(Continued on Page 16)

The AICPA Standards

Competence Standards

(1) Management advisory services are to be performed by persons having adequate training and experience in both the application of the analytical approach and process and in the subject matter under consideration.
(2) In all matters relating to a management advisory services assignment, an independence in mental attitude is to be maintained by the member and his staff.
(3) Due professional care is to be exercised in the performance of management advisory services.

Practices Standards

(1) *Personal characteristics*. In performing management advisory services, a practitioner must act with integrity and objectivity and be independent in mental attitude.
(2) *Competence*. Engagements are to be performed by practitioners having competence in analytical approach and process and in the technical subject matter under consideration.
(3) *Due care*. Due professional care is to be exercised in the performance of a management advisory services engagement.
(4) *Client benefit*. Before accepting an engagement, a practitioner is to notify the client of any reservations he has regarding anticipated benefits.
(5) *Understanding with client*. Before undertaking an engagement, a practitioner is to inform his client of all significant matters related to the engagement.
(6) *Planning, supervision and control*. Engagements are to be adequately planned, supervised, and controlled.
(7) *Sufficient relevant data*. Sufficient relevant data is to be obtained, documented and evaluated in developing conclusions and recommendations.
(8) *Communication of results*. All significant matters relating to the results of the engagement are to be communicated to the client.

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With Clustered Terminals Filing

Regulation vs. Competition the Issue in AT&T Tariff

By Manley R. Irwin
Special to Computerworld

In the 1930s government wore a white hat. The private sector was paralyzed by crisis, and it fell upon the public sector to attempt to resuscitate an insolvent economy, to spawn a host of regulatory agencies to protect the public interest and to declare involuntary unemployment would no longer be tolerated.

Now we have come full circle. The hat is no longer white. Fiscal fine-tuning proves an exercise in arrogance; the monetary stop-and-go policy destabilizes our economy; and price guidelines, freezes and thaws cast a pall of uncertainty in an economy ridden by random shocks.

The suspicion is growing that government can be insensitive, may be unaccountable and often immunizes firms from the rigors of real market competition.

Amidst this track record one can discern a return to first principles, namely a reaffirmation of the competitive marketplace, a rejuvenation of the antitrust laws, a termination of legalized price fixing (Fair Trade Laws) and deregulation of industries that masquerade as "natural" monopolies.

But the momentum of the past persists. The machinery of government stands idle, a mechanism that can be activated by a routine filing of a tariff before a regulatory agency. This automatic process was recently set in motion when AT&T filed a tariff schedule on a cluster of terminals – a tariff which holds the potential of blanketing the computer industry with federal regulation.

Of course the filed tariff was not called a computer terminal; no regulated firm would be so indiscreet. Rather, the tariff was filed under the euphemism "data communications terminal service." But Arthur D. Little's marketing study backing up AT&T's proposed service was less discreet, calling its study "The Outlook for Compuer Terminals in a Changing Competitive Environment."

'Sir, One of the Technicians Wants to See You About a Possible Misprint in a Service Manual.'

Economic Issues

The tariff places several economic issues on the public agenda. A first is whether computer terminals qualify as a "natural monopoly."

The answer to this question turns on the competitive nature of the industry, whether capital requirements deter market entry, whether product innovation best thrives in a regulated environment, whether the private marketplace is responsive to the needs and requirements of the consuming public.

Certainly no other industry has enjoyed the dynamism of product innovation experienced in the computer terminal market, and a tariff contemplating regulation approaches a new high in policy irony.

A second question is whether clustered CRT terminals should be offered by a regulated monopoly, even though such hardware has been on the market for some 10 years. An affirmative answer assumes that the private marketplace is ineffectual in bringing a broad array of equipment to the consuming public and that only regulated monopoly can achieve superior efficiency.

If the computer terminal market is characterized by competition, and it is, should public policy encourage a regulated monopoly to diversify into a competitive market? Here the name of the game is cross-subsidy; the complexity attending prices, profits and investment between competitive and regulated markets has eluded conditions at the federal and state level for decades.

'Regulatory Inequity'

A third question follows. Once regulation of clustered computer terminals is sanctioned, will not such action create "regulatory inequity" and thus lead to an extension of the common carrier principle to other terminal suppliers?

And precisely where would regulation stop? Would it not embrace microprocessors, minicomputers and eventually mainframe computers as fit candidates?

It does not take a great deal of imagination to conjure a "grandfather clause" that would sweep a $15 billion industry under government surveillance in the guise of protecting the public interest.

Fourth, does the Federal Communications Commission (FCC) possess the resources or the will to carry out effective regulation of the computer terminal market – to examine, assess and evaluate the prices, costs, profits and investment of such equipment and its manufacturers?

Perhaps the FCC can, but it is useful to note that one reason the commission has never tracked the costs, prices and revenues of Western Electric's 350,000 is because such a task is virtually impossible – contrary to the recent assertions of AT&T.

Captive Affiliates

A fifth issue turns on the policy and practices of integrated carriers buying computer equipment and hardware. Should the carrier be encouraged to buy equipment from captive manufacturing affiliates, or should equipment be purchased on the open market?

The issue here is more than establishing a procedure that best ensures the reasonableness of the carriers' investment rate base. Rather, the issue raises profound questions of antitrust and market foreclosure as well.

The sixth question focuses on the marketing practices of the carrier supply affiliate, in this case Bell's Teletype Corp.

Teletype sells its equipment to both Bell and non-Bell customers. What are Teletype's discount policies? Do they apply equally to all customers; are they restricted to regulated carriers only, are they given to the Bell operating companies alone? Is Teletype both a captive vendor and an interconnect supplier?

A seventh question focuses on. buyers of computer equipment. If an individual purchases computer terminals from Teletype, then leases a cluster to the airline industry as a service, does that user now fall within the reach and jurisdiction of the FCC? Is it now possible that the user might be engaging in a "pseudo" common carrier activity and hence be subject to a license of convenience and necessity?

In sum, the policy dimensions riding on a small tariff filed before a district commission in a faraway city are profound indeed. Yet the issues are part of a much larger dialogue now being debated on the national scene – the role of government, the function of the competitive market and the conflict between the two.

Nowhere is the juxtaposition between regulation and competition more clearly drawn than in the present case pending before the FCC.

However the issue is resolved, an economist from the University of Chicago once observed the most compelling argument against big business was not that a firm raised prices, restricted output, extracted profits, deadened innovation, stifled efficiency or ignored consumer needs.

The real case against a monopoly firm, he asserted, was that it spawned big government and thus precipitated the demise of what we know as a free enterprise economy.

Irwin is a professor at the University of New Hampshire's Whittemore School of Business and Economics.

Reader Commentary

Approach of AICPA Could Provide Model to DPers Seeking Standards

(Continued from Page 13)

provide the basis for quite such a list, but even here it does provide a checklist for task activities. Good work is needed, but, in addition, due care requires reviews of work accomplished and judgments exercised.

Moreover, the reviews should be both "systematic" and "critical." All in all, this seems to be part of the operation that is most often left out of the structure in many DP investigations.

Provides Checklist

If it really does what it says it does, the AICPA group should be turning out excellent work.

Practices standards No. 4 and No. 5 are not of direct interest, being concerned with client matters. However, No. 6, "Planning, Supervision and Control," again provides a checklist. Planning requires:

- A structured set of activites and events within a targeted time schedule.
- Monitoring of the activity.
- Potential revision of the activity.

Supervision, curiously enough, does not have any specifics. It does, however, require that the practitioner in charge determine the amount of supervision needed. Apparently this cannot be delegated.

Control is something else and must be documented, measure progress at "significant" points and evaluate progress at these points in terms of accomplishments, time schedule and work quality.

Data Sources

Similar documentation requirements are hidden in the standard requiring "Sufficient Relevant Data." These include the source of any evidential data used, the alternatives considered and the analytical process used to arrive at the recommendations.

This alternative standard system is working in DP investigations throughout the country.

I think it is an important but different approach to DP standards that has many implications, one being that we might well consider scrapping our current approaches to DP standards or professionalism and start fresh, using the AICPA ones as a first model.

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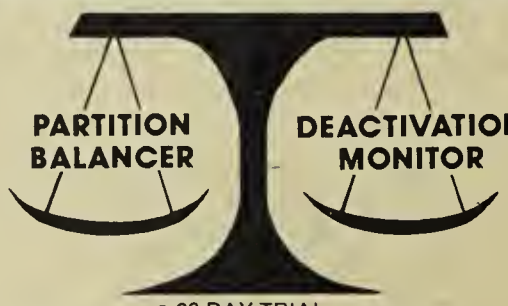

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Jomo tells the scheduler or operator which jobs should be run together for maximum computer utilization. It also tells the user when the system is underutilized and warns before it becomes overloaded, Labyrinth said.

Jomo is said to rate each production job with a number which "represents the percent of the computer's processing capacity it uses." With each run, a job's rating is updated in the Jomo library, a spokesman noted, although he gave no information on how the "percent of the computer's capacity" used by a job is determined.

During execution of a production job mix, Jomo is said to keep track of the proportion of the computer's capacity in use. If this is low, the company said, "heavy jobs should be loaded," suggesting Jomo itself does not trigger the loading operation.

Jomo is available now for an introductory cost of $2,495, Labyrinth noted from 2 Penn Plaza, New York, N.Y. 10001.

VSPC May Ease Use, But at High Cost

By Don Leavitt
Of the CW Staff

WHITE PLAINS, N.Y. – The way IBM introduced the Virtual Storage Personal Computing (VSPC) program product [CW, Jan. 12] seems indicative of the way the vendor is attempting to meet the challenge of "personal computing," as it uses the term.

The formal press announcement earlier this month referred to VSPC as having been "announced recently." Though the user community hadn't been aware of any such earlier announcement – except perhaps in some rare cases – it now appears IBM field offices received word of the product in early December.

Perhaps it was the holiday season or perhaps the low-key nature of that original "announcement," but users were left waiting for answers when they first tried to get clarification of some of the phraseology used in the January press release.

In any case, the stuttering nature of the VSPC introduction merely echoes IBM's somewhat erratic moves toward real support for "personal computing" by users who aren't dedicated to data processing. The first step perhaps was the Time Sharing System (TSS), an ill-fated effort born in the 1960s.

The Time-Sharing Option (TSO) of IBM's operating system was clearly an outgrowth of the TSS experience and seemed to come much of the way that needed to be traveled before the computer really could be used comfortably by those outside the club.

TSO has had its share of criticism – some have charged it is clumsy, complex to use and expensive in the resources required to let it run efficiently – but at least the more sophisticated users have become used to its challenges and are able to use the system.

Analysis

Some users, such as Don Deese [CW, Jan. 12], have even become comfortable enough with TSO to identify its weak points, or the weak points of users attempting to interface with it, and to take the time to document ways to make the system work better.

For now, at least, VSPC appears to be IBM's latest attempt to get past many of the users' objections to TSO. It seems to provide an interface that is much less challenging; the desire to make the 370 "more approachable" was stressed by IBM spokesmen in talking about VSPC earlier this month.

But – as with any convenience – there is a heavy cost to VSPC, quite aside from its monthly license fee. A 370/115 or 125 operating under DOS/VS can support three or four users "for trial purposes" if the system includes 256K of main memory.

VSPC, along with Virtual Transmission Access Method (Vtam) and Virtual Storage Access Method (Vsam) coding, both of which are needed, utilizes "about 200K" of that configuration, IBM estimated. The remainder apparently can be used for the DOS/VS supervisor and other overhead.

It appears, for now, that Power/VS, also needed if VSPC under DOS/VS is used for conversational remote job entry, is included in the 200K needed by the "personal computing" software.

OS/VS1 users who want to implement VSPC require a 370/135 or more powerful CPU with 384K main memory. Vtam, Vsam and, for conversational remote job entry, the Job Entry System I (JESI) are required to keep this system going, IBM acknowledged. It wasn't clear what, if any, other work could be done on this sized system if VSPC was in use.

For OS/VS2 installations, the minimum configuration for VSPC operations is a whopping 2.048M main memory. JES 2 or 3 is needed for remote job entry along with Vtam and Vsam. Typically the operating system itself takes about 1M bytes of memory in this situation, and the remaining memory will support the user's "usual things" as well as VSPC, IBM said.

Partly because it doesn't require direct monitoring by the DP staff, VSPC includes its own job accounting routines so costs can be analyzed and, if desired,

(Continued on Page 18)

User Services Enhanced by Networks

Users of remote computing services can consider extended capabilities from vendors at opposite ends of the country.

Last month, General Electric (GE) in Rockville, Md., introduced a Continuous Access Plan (CAP) for applications that need frequent access to the Mark III network but have low I/O volumes. It also added support for computer output microfilm (COM) for users with massive output.

And Los Angeles-based Computer Sciences Corp. (CSC) reported earlier this month that it has doubled the capacity and increased the capability of the nationwide communications network that supports the company's Infonet service. These improvements resulted from installation of switching communications concentrators and biplexers, CSC said.

Under GE's CAP, users may dial into the Mark III system with a local phone call and stay connected as long as the need exists. For this they pay a flat monthly fee and special "kilocharacter" rates, rather than being billed for ongoing use of the system resources.

GE envisions order status checking, inventory tracking and data base inquiries in general as ideal uses for this approach to paying for service. Applications with high-volume I/O may run under one of the alternative pricing plans.

COM is seen by the net as "ideal" for jobs requiring preparation of large reports – 500 pages or more – with periodic updating. It is also useful for reporting jobs requiring multiple copies, timely turnaround and easy-to-reference material, a spokesman suggested.

Both microfiche and rolled microfilm formats are available with the GE service, and users may select 24X or 42X reduction sizes, he said.

In discussing its enhancements, CSC said the biplexer doubles the speed of data transmission of 19.2 kbit/sec over standard common carrier facilities. The device also routes data traffic to available circuits, increasing network reliability, the firm said.

The switching concentrators enable Infonet clients at any point in the network to use computers in data centers in Los Angeles or Chicago. The installation is also said to increase the number of points from which users can access the system by a local phone call.

Correction

An English language translation of Jean Dominique Warnier's *Logical Construction of Programs*, recently reviewed by Peter M. Neely [CW, Dec. 10, Dec. 24], was published in 1974 by H.E. Stenfert Kroese N.V., Post Office Box 33, Leiden, Holland.

The 222-page book sells for 40 Dutch guilders or approximately $15.

Packages Gain Marketer in U.S.

NEW YORK – Two packages originally developed in Europe are now available to IBM-based installations in the U.S. through Standard Data Corp. here.

The Easy Access Report Language (Earl) supports an English-like command language which allows even non-DP-oriented users to perform a range of everyday tasks, Standard Data explained.

Originally conceived and developed by Cambridge Data Processing in England, Earl has been enhanced and marketed throughout Europe by Computer Associates International of Zurich, Switzerland.

Standard Data has also acquired exclusive marketing rights in the U.S. for Computer Associates' CA-Sort II.

Pansophic Systems Inc. – which sells the package under the name Pansort – has now withdrawn its marketing of the product in this country.

Files under Earl may be sequential or indexed sequential and may carry either standard or nonstandard labels. The report generator allows the user to redefine fields as needed and to perform "a number of data manipulations" while generating an updated file or report, Standard Data said.

In common with various other packages, Earl formats the reports it generates, including automatic spacing, insertion of page headings, line and column captions, underlined totals and subtotals, control breaks and page skipping.

Earl can be acquired immediately for $9,000, with lease plans available.

Described as a plug-to-plug replacement for IBM-provided sorts, CA Sort II provides several advantages, according to Standard Data. Savings of up to 50% in disk space and I/O activity are not unusual, the vendor said, and savings in memory space and CPU time are also common.

The OS version of CA-Sort II is available for $7,000; the DOS version sells for $5,500. Monthly lease and license plans are available, Standard Data noted from 1540 Broadway, New York, N.Y. 10036.

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ECS Prices Up

LEXINGTON, Mass. – Price increases go into effect Feb. 15 for general accounting packages marketed by ECS Information Systems, Inc. to IBM System/3 installations.

As of that date, the ECS accounts payable and general ledger packages will cost $495 each and the payroll system will cost $525, a spokesman said. Written in RPG-II, the packages can be installed by mail, he added.

The payroll system operates on a 16K disk-based Model 10 and produces weekly, quarterly, yearly and "as-requested" reports.

Included in the master file is detailed information on both active and terminated employees, ECS noted.

The accounts payable and general ledger packages utilize the same hardware as the payroll system.

The firm is at 21 Worthern Road here in Lexington.

Psi-Tran Systems Back Cobol Programmer

ARLINGTON, Va. – Psi-Tran Corp. is offering two systems which enable users to determine the total usage of Cobol-based data files and to maintain Cobol programs.

The Data Administration System (DAS) provides a method of determining the total usage of any data element, record or file across an entire system or subsystem of Cobol programs, Psi-Tran said.

DAS generates a series of reports using as input the Cobol programs and JCL base comprising the system or subsystem. Any data element with a given physical location within a data set can be traced to every program which uses that data element, the firm said.

The Data Correlation and Documentation (DCD) system was designed to create and maintain current and accurate documentation of Cobol programs.

With DCD, "all that is required for a complete program maintenance manual is the addition of some overview narrative describing the purpose and basic functions of the program," the company said.

DCD analysis data can be obtained automatically with every clean compile, selectively at compile time or independent of compilation; there are no special codes or symbols to decipher, the firm said.

Both DSA and DCD operate on IBM 360 and 370 systems under OS MFT/MVT and all releases of VS1 and VS2. They presently cost $6,000 each or $9,500 when purchased together.

On March 1 the price will go up to $8,000 each with a 20% discount available to multiple sites. Maintenance is free for the first year and costs 10% of the purchase price every year thereafter.

Psi-Tran can be reached through P.O. Box 9467 here in Arlington, 22209.

Utility Extends Print Control

OAK BROOK, Ill. – Topping the list of several features added to Easytrieve, an information retrieval and data management system, is a capability to print preprinted forms and customize report formats, the utility's vendor, Pansophic Systems, Inc., said.

Version Six of Easytrieve also allows users to call any nonstandard processing routine (such as a floating decimal) into the system; produce reports with complex bar graphs; subscript through a record or array for a particular character string and report on it; use the ELSE command to specify alternate processing; and produce a hexadecimal printout of the record to identify the bad data element when a data exception is encountered.

Version Six, which applies only to IBM versions of Easytrieve, has increased maximum sort fields from five to 10, control break levels from four to nine and now has up to 15 quantitative fields that can be specified in a report for automatic subtotals and final totals, Pansophic said.

Easytrieve is priced at $12,500 on a perpetual license and discounts are available to current users of Pansophic systems or for multisite licenses. The firm is at 709 Enterprise Drive, Oak Brook, Ill. 60521.

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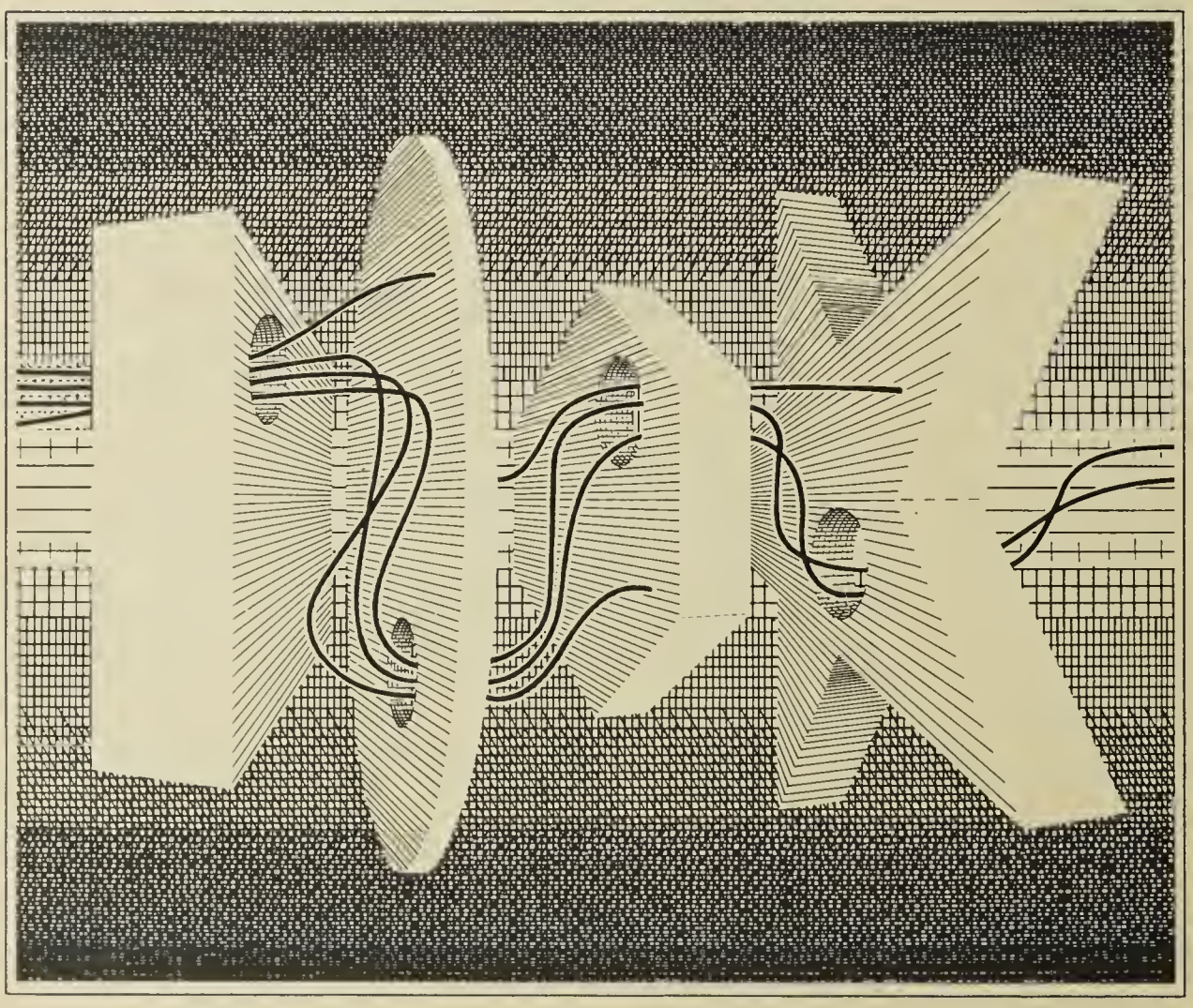

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IBM 3350 Support Added to 'Discal'

PHILADELPHIA – A version of the Disk Capacity Calculator (Discal) which includes support for the IBM 3350 disk is now available from Universal Computer Services.

The program was designed to help analysts plan disk space requirements when developing or converting disk-based systems with sequential or index sequential files.

Based on a parameter card, Discal calculates the number of tracks required for a given number of records, record capacity for a given number of tracks, a series of effective track utilizations for a given range of blocking factors and new device track requirements for a given number of tracks used on the old device when converting from one disk to another, the firm said.

In addition to the IBM 3350, Discal can be applied to the 3340/3344, 3330, 2314/2319 and 2311 disks. It is written in Cobol and runs on IBM 360s and 370s under DOS, DOS/VS, OS or OS/VS.

The program, which requires a 12K partition, card reader and printer, is available for a one-time charge of $125 from the firm at 2202 Delancey St., 19103.

VSPC Capabilities Add Heavy Overhead

(Continued from Page 17)

charged back to the user departments. Both connect time and CPU time are identified by user, IBM said.

There is nothing in the hardware or software limiting the number of users VSPC can support; "that depends more on the type of work each is trying to do," a spokesman said.

It appears this latest program product is intended to help the really big shops set up in-house time-sharing networks to get work off the user's DP staff.

And perhaps it is intended, at the same time, to prevent all the problem-solving uses from migrating to commercial remote-computing networks outside the user's installation.

Critic in UK Journal Finds

DMS-1100 Works Well Despite 'Unpleasant' Features

By Don Leavitt
Of the CW Staff

LONDON – Univac's data base management system for its 1100 series, DMS-1100, is still quite clearly in an early stage of development, according to K.A. Robinson of the Surrey County Council.

Writing in *Database Journal*, he noted the software, "though limited in scope, works extremely well; it is stable and efficient."

On the other hand, he added, "it has some rather unpleasant and error-prone features. Some of these are features of DMS-1100 itself," but some are related to the Codasyl data base proposals on which Univac built the system.

"It may be ... these are features of which only the careless programmer will fall foul," he admitted, but "programming is not performed by means of constant references to manuals, and a well-thought-out language links the syntax of its commands with the programmer's understanding of their semantics."

The failures in DMS-1100 and in the Codasyl proposals "are violations of this principle," Robinson charged. He acknowledged, however, that both DMS-1100 and Codasyl are changing, "generally for the better [although] the pace of change is slow."

Getting down to his specific concerns, Robinson said DMS-1100 provides no subschema facilities beyond those which allow the user to copy into his programs those records, sets and areas which are actually needed.

"Even this rudimentary facility is provided in a nonstandard way," he complained.

DMS-1100 provides none of the privacy features proposed by Codasyl, he continued. "When taken together with the lack of subschema facility, this is fairly serious since the entire data base is potentially available in update mode to all programmers."

Some of the privacy facilities of the Exec-VIII operating system must be used to prevent unauthorized or accidental access to data, he noted a little later.

On a more positive note, the critic said Univac has provided "reasonably powerful" facilities for mapping the data to the physical media. These facilities give the data administrator a "high degree of control" over the physical locations to which newly stored or modified records will be written.

Although this theoretically allows the administrator to leave expansion gaps in groups of records, the mechanism for creating these gaps is "cumbersome to use and could be substantially improved with a minor amendment to its syntax."

Although superficially similar, the "record delivery area" defined by Univac and the "user working area" from the Codasyl specifications are "crucially different" in the way their internal spaces are organized. The differences are responsible "for a very common programming error when using DMS-1100," Robinson charged.

Data Basics

The error occurs, he explained, if the application program is constructed with the data base record descriptions defining discrete areas of storage rather than overlaying the record delivery area.

The application programmer is often forced to construct his program in such a nonoverlaid manner, Robinson noted, either because his application requires at least two types of records in store at the same time or because he adopts the (usually) good programming practice of not overlaying data areas.

With Univac's definition of a record delivery area, however, such nonoverlaid definitions often leave data stored elsewhere than in the field carrying its name, according to Robinson.

Database Journal is published quarterly by A.P. Publications Ltd., 322 St. John St. here in London EC1V 40H. It is available in the UK for £10 and in the U.S. for $39.50 annually.

Datacom Facility Aids Multiple Users

DALLAS – A Multiple User Facility is being added to the Datacom data base management system, according to the vendor, Computer Information Management (CIM).

Designed for use in IBM DOS, OS and VS environments, Datacom can also be used under the Computer Software Co.'s Extended DOS (Edos). The system is said to support as many as 15 keys or search arguments for each of 240 logical files.

Maintenance of keys and file interrelationships as well as partial or total data base reorganization have been among the system's capabilities for some time, the firm noted, along with optional compression and expansion of data records which may be fixed or variable in length.

Datacom supports a search capability and rapid sequential processing of files through multiple buffers. User application programs may be written in any language that supports a CALL facility, CIM added.

The Multiple User Facility will permit current user programs in all regions or partitions of the mainframe to access and update, with exclusive control, the same data base on a multitasking basis, a spokesman explained.

Initial deliveries of the Multiple User Facility will begin in the first quarter to current Datacom installations. Initial deliveries to new users will begin in the second quarter, the spokesman said.

Datacom/DB uses only 25K plus buffers. The OS version costs $28,000; the DOS implementation, $22,000. The Multiple User Facility is an additional $8,400 for DOS or DOS/VS shops and an extra $13,000 for OS and OS/VS, CIM said from 3707 Rawlins St. here in Dallas, 75219.

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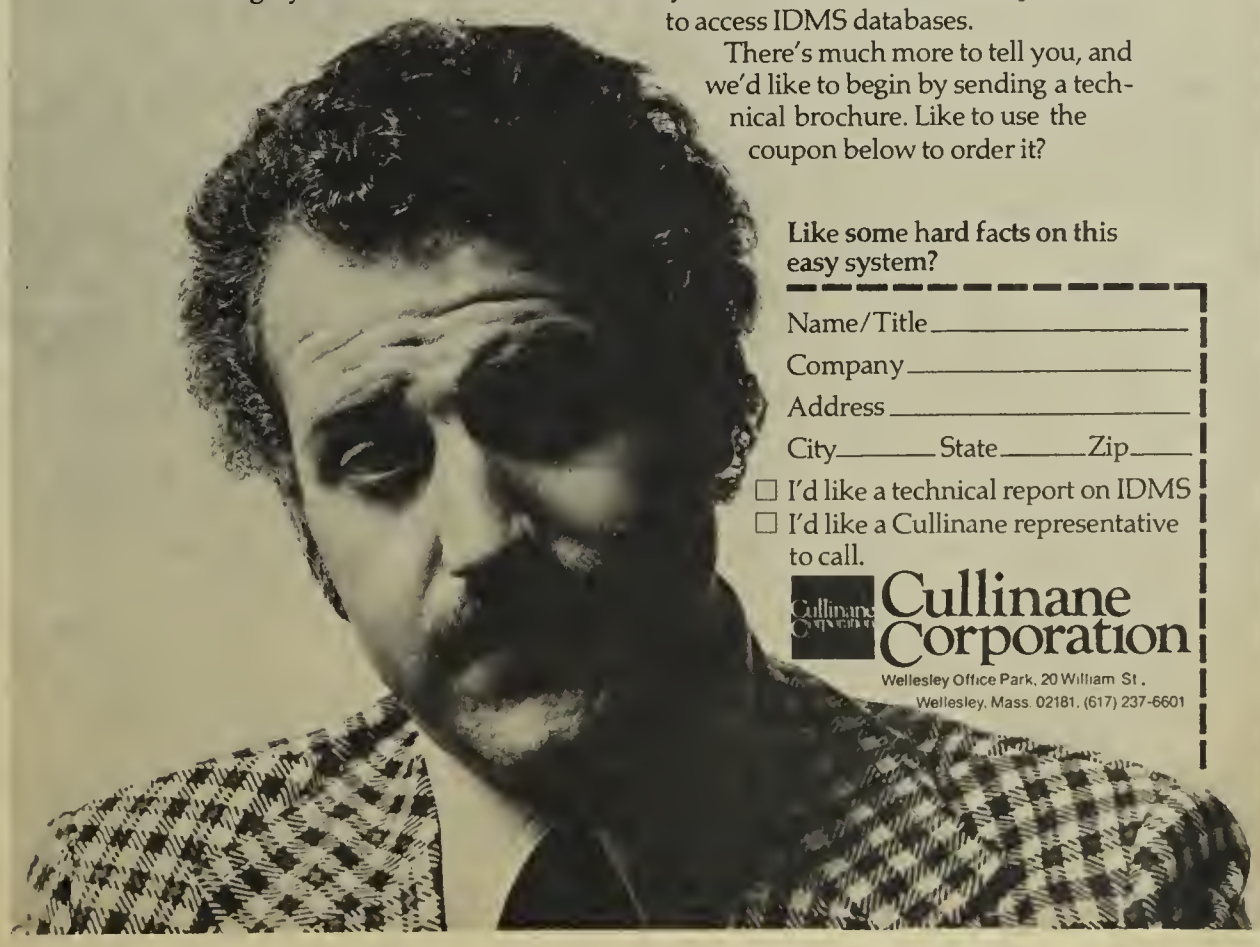

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Improvement in Fleet Upkeep Shows Data Base Value

Though there has been much discussion on the technical points of various data base management systems, little has been written on how or why a data base may be better than a conventional file system. The following story provides such a focus.

Special to Computerworld

PRINCETON, N.J. – "In today's economy, maintenance management is money management for fleet operators," according to Herbert R. Kane, president of Mainstem, Inc., based here.

Kane is in a position to know. Mainstem's computerized data base is monitoring some 151,000 vehicles on behalf of 191 clients operating across the U.S. and Canada.

Of these, 54,000 vehicles are operated by 33 common carriers; 65,500 belong to 65 municipalities; and 31,500 are used by private carriers.

"In the real world of fleet operation, managers have to live with trade-offs. Vehicle purchase policies affect maintenance costs; so do assignment and productivity of people as well as scheduling and supervision of preventive maintenance," Kane said.

"In other words," he explained, "the key to survival in the kind of economy we are going through lies in management analyses and judgment. Computer-produced information can be a vital tool – but it is nothing unless it is put to practical use by experienced people."

To illustrate, Kane pointed out fleet maintenance costs average 7% to 12% of gross revenues. Costs of Mainstem services average 2% of gross revenues for small fleets and 1% for larger operators.

On the other side of the ledger, savings averaging 5% or more are realized regularly by fleet managers who use and follow up on Mainstem reports. To help assure results, Mainstem has developed a field staff on fleet advisors.

Not Content With Convention

Given this orientation, Mainstem has not been content with a conventional statistical approach to computer processing of maintenance information. Rather, Mainstem uses a data base approach which calls for retention and continuing reuse of detailed source records.

Mainstem builds no summary or recap files, even for individual clients for whom maintenance analysis reports are produced regularly. Files containing billions of items of data are processed from scratch to produce each set of management reports.

This requires a lot of processing functions by the computer. But, as a trade-off, Mainstem retains complete flexibility for structuring reports and for use of its massive data bank for industry research, Kane said.

This philosophy led Mainstem to upgrade its facilities in the fall of 1974 with installation of an NCR Century 251 computer with a multiprogramming central processor as well as massive memory and random-access file capabilities.

This caliber of flexibility, in turn, required uniform input records covering a broad cross-section of areas where vehicles encounter operating or maintenance costs. This requirement has been met through design and widespread use of a series of some 14 Mainstem forms for keeping records on individual vehicles, fuel dispensing and maintenance facility operations.

These forms were designed to provide both on-site operating records for client organizations and input media for Mainstem's computer.

Significantly, the Mainstem forms concentrate on individual vehicles, maintenance labor and facilities costs. This, Kane admitted, is different from some systems which attempt to track types of repairs or parts used.

Input from fleet maintenance source documents is handled by Mainstem on key-to-disk equipment which transfers batches of data to magnetic tape for computer input. However, Mainstem has placed an order with NCR for special-purpose data recorders which will make possible direct on-line entry of information into the Mainstem CPU from fleet garages and offices. Under this approach, source data will be transmitted via telephone lines.

The main memory of Mainstem's NCR Century 251 has a capacity for 192,000 bytes of data while the on-line disk files hold up to 192 million bytes for immediate reference. This capacity makes it possible to store complete files for any fleet for on-line access while processing takes place, Kane said.

Data base processing is scheduled on a monthly basis for all Mainstem clients. All reports are reviewed by the firm's research department to assure reasonableness of results before they are distributed to clients.

Since all processing is performed with actual source records, Mainstem retains considerable flexibility in the dimensions and formats of its management reports, Kane said. Separate data selection and output programs can be developed with relative ease to tailor reports to management needs. More sophisticated reports and formats are explored continuously by Mainstem's staff.

Data Basics

Reports for Clients

For each client organization, a series of reports is tailored on a need-to-know basis for managers at different levels. A maintenance manager, for example, needs different, more detailed information than a terminal manager. Corporate, home-office executives need still different information.

Tailored to Situations

Because of the flexibility inherent in Mainstem's file-oriented, data base processing, content and formatting of these reports is tailored to the situations and management methods of individual fleets. Most reports delivered by Mainstem reflect some variation of a series of available standards or options.

The greatest continuing use of Mainstem reports, according to Kane, is for facilities management. Most fleets which lack thie level of management information will have either too few or too many people in their maintenance facilities or they will have garages which are either too big or too small for their workloads.

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Modem Supplier Head Predicts

Voiding of DAA Requirement to Lower Costs to Users

By Ronald A. Frank
Of the CW Staff

WILTON, Conn. – The recent decision by the Federal Communications Commission (FCC) to eliminate the requirement for the Bell Data Access Arrangement (DAA) "will reduce the total cost of communications service" to users, according to Charles Johnson, president of General Datacomm Industries, Inc., a modem supplier.

If the user is now leasing the modem from an independent supplier and leasing the line, the cost will drop. If he is buying the modem and leasing the line, there may be a slightly higher cost for the modem, but the cost of the line will be reduced because the monthly DAA charge to the phone company will be eliminated, Johnson said in an interview.

The cost of getting equipment certified is "reasonable and proper" and it will not even be noticed by the average user, Johnson said. A device should not be certified unless it is to be supplied in volume to users and, under that condition, the cost should equal "less than $1 per box" when passed on to the customer, he predicted.

Converting that cost to a rental basis will mean about 5 cent/mo compared with a Bell DAA that costs about $5/mo, he said.

The fact that the user will now be able to connect directly to the phone line will create low-cost devices previously "blocked by the DAA."

These will include equipment for such applications as meter reading in the home, where the fixed cost of the DAA had made the concept invalid. Home-based control systems that could be activated from remote sites using low-cost LSI modems are now within the realm of feasibility, he said. Right now the telephone line coming out of the home to the phone company office is utilized only about 1% of the time on the average.

As a result of the FCC ruling, users will have three options, Johnson said. They can purchase certified DAAs that will be mechanically interchangeable with Bell units, they can rent a Bell DAA as they do now or they can select a modem that contains DAA-equivalent circuitry that can be connected directly to the phone network.

While users will have more options, they have lost none of their existing methods of interconnection, Johnson said. For a user that has many non-Bell modems installed with Bell DAAs, it will be possible to replace the Bell couplers with certified equivalent units from an independent supplier.

Costs Could Drop

Current purchase cost estimates of about $50 for a manual (CDT) DAA and about $100 for an automatic (CBS, CBT) may still be high, Johnson said, and it is quite possible that independent suppliers will be able to bring costs below this figure.

Suppliers now have two options when they introduce modems. They can either have the modems certified for direct connection or they may choose to have all equipment, both existing and new, interface with the telephone network through a standard certified DAA-equivalent unit, he said.

In the case of General Datacomm, the firm supplies modems that are equivalent to the Bell 103, 202, 201 and 208 data sets, and these will have to be certified, Johnson said.

One suggestion has been that Bell might offer users the option of purchasing the telephone company DAAs which they now have installed in their networks. Johnson said this "wouldn't hurt anything" and would help the phone company dispose of the problem of what to do with the couplers.

One of the biggest benefits to users will be that any restrictions in performance have now been removed. The user will now get better performance because "any time you put an electronic device in series with another device, it can only detract from the overall performance," he said. So eliminating the DAA will be an operating improvement for the user.

The exact improvement to be gained from eliminating the DAA will be difficult to measure, in Johnson's opinion. On the low-speed modems, the improvement may not be noticeable, but at the higher speeds there could be significant improvement. One direct result could be higher speed transmissions over dial-up lines, he said.

For vendors who choose to build DAA circuits into their modems, there may be some engineering development costs to reengineer their equipment, Johnson said, "but the economics might warrant that approach."

DB/DC Design—Part 2

System Operationally Self-Governing

This article is the second of two which describe generalized data base/data communications design. Similar systems are now operating at several Burroughs Corp. user sites in the Philadelphia area.

By Charles St. John Smith Jr.
Special to Computerworld

Operationally, the data base/data communications system is self-governing. To initialize the system, only the data base handler (DBH) is manually executed. The DBH verifies the integrity of the data base, initiates auditing as required and, when the data base is ready for processing, the DBH requests that the operating system execute the network control program (NCP). The NCP requests the operating system to execute the appropriate message control systems (MCS).

When the MCS has initiated requested auditing, it establishes communications (via a queue) with the initiating NCP, and the NCP brings up the terminal network.

By using an automatically sequenced initialization sequence, the designer is guaranteed that, when a terminal is activated by the system, the system is ready to process messages from that terminal.

When the first message which uses a particular processing program is received by MCS, the MCS requests the operating system to initiate that program.

When a message is received by the MCS from a transaction program, the MCS checks the program queue to determine whether there are more messages for that program. If there are no more messages, the MCS requests the operating system to stop and roll out the transaction program.

As messages are processed by the MCS, the status of the required program is checked and, if it is stopped, the MCS requests the operating system to roll in and start the program.

Discontinuing System Operation

To discontinue operation of the system, only the MCS is notified by a control terminal. The MCS queues an end-of-job (EOJ) message for each operational program and notifies the NCP that a discontinue request has been made. The NCP, upon receiving the initial discontinue request, puts all lines in an "output-only" status, allowing delivery of responses to prior requests and denying further access to the system.

When all transaction programs have responded to the EOJ message, the MCS sends EOJ messages to the NCP and DBH. The NCP closes all lines and goes to end of job. The DBH finishes auditing, creates any recovery data which may be required, closes the data base and goes to end of job.

When both the NCP and DBH have responded to the EOJ messages, the MCS finishes auditing, saves any queued information which could not be delivered and goes to end of job, completing shutdown of the network.

Numerous Benefits

There are numerous benefits to this generalized design. By modularizing the component parts of the system, development can proceed on all portions in parallel, reducing elapsed time between design and implementation.

Smith is branch systems manager at Burroughs in Philadelphia.

Unit Links NCR Banking Terminals With IBM, Burroughs Mainframes

DAYTON, Ohio – NCR Corp. has a communications adapter which allows the NCR 770 self-service financial terminal to be used by banks which have IBM or Burroughs mainframes.

The NCR 759 communications adapter can also be used with NCR 270, 275 and 279 financial terminals, the NCR 260 general-purpose thermal-printing terminal and the NCR 796 visual display terminal.

In linking the 770 with an IBM or Burroughs CPU, one adapter per terminal is required. However, up to 12 of the other NCR terminals, linked to an NCR 751 digital concentrator, can be tied to an IBM or Burroughs mainframe using a single adapter, NCR said.

Control logic within the adapter provides operation on both private lines or dial-up telephone networks. On a dial-up network, the connection can be established manually.

Monthly rental for the 759 communications adapter is $150 and the purchase price is $3,000. Software for the adapter is provided at no additional charge.

Rental for the 751 digital concentrator used with the communications adapter is $85/mo. Its purchase price is $1,785.

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With RO Printers

Net Coordinates Truck Orders

HIGHLAND PARK, Mich. – Terminals are helping to set options, standards, nuts, bolts and screws so each Dodge truck, van, pickup and recreational vehicle chassis is configured exactly as the customer specified. The Dodge production rate is maintained with a broadcast network utilizing General Electric (GE) Terminet 300 receive-only (RO) printers.

The printers on the assembly line are the end of the line for paperwork which originates in Dodge dealer sales offices across the country.

After a customer has signed an order for a particular Dodge truck which lists color, options and so on, the order is forwarded to one of 22 zone offices throughout the U.S. Each zone office is a minidata center where the information is coded, then transmitted to Chrysler Corp. headquarters here in Highland Park.

The hub of the Dodge truck system is the data control center. Truck manufacturing information is input to CPUs from the DP center in Chrysler's sales group headquarters. Output of the manufacturing information is received on assembly lines in the Warren, Mich., plant on the RO printers.

In the Warren DP center the orders are edited and coded. A four-digit number is assigned to the vehicle in the "body in white" shop and the order is put into production.

This information is sent back to Highland Park for resubmission to the regional offices so each has a daily report on the status of the vehicle ordered and when it is scheduled for completion.

A "track sheet" with coded information and vehicle production number is transmitted to the printer on the assembly line via telephone lines. The track sheet keeps tabs on the vehicle throughout its manufacturing process.

Identical information on the vehicle is received on all printers at one time. The person responsible for each workstation group then puts the sheets in order to coordinate the information with the production schedule.

Range of Configurations

The versatility of the system permits a range of configurations – from one computer message to 56 locations to four separate computer messages sent to up to 14 locations.

The RO printers are configured with 118 print columns, pin feed, motor control, integral modem, external paper handling, horizontal tabulation, vertical tab and form feed, tear-off bar, large print font, control panel and a pedestal with a forms shelf.

Each vehicle coming down the production line requires on-the-spot documentation to describe the vehicle with all its options. The accuracy and speed of the printed track sheet are crucial; if the body arrives ready for assembly and the production worker does not know which subassembly at his station to put on that vehicle, for example, the entire production line stops.

Terminal Transactions

Hazeltine CRT Allows Customizing by OEMs

GREENLAWN, New York – Hazeltine Corp. has introduced an OEM terminal which is said to have a range of capabilities from teletypewriter replacement to editing and polling.

The OEM buyer can customize the Modular One to a specific user requirement by choosing from a list of options for the basic terminal, the company said.

The basic terminal configuration provides a 1,920 character display on a 12-in. screen; incremental and absolute cursor positioning; and a 10-key numeric pad on a movable keyboard.

Other features include a choice of eight transmission rates up to 9,600 bit/sec; communications interfaces switchable between RS-232 and current loop; and a white-on-black or black-on-white display presentation.

A polling option provides the necessary protocol compatiblity for interfacing to communications networks, the company said.

The terminal costs $1,275 from Hazeltine here in Greenlawn, N.Y. 11740.

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Megadata Has Intelligent, Dual-Language CRT Units

BOHEMIA, N.Y. – Megadata Computer and Communications Corp. has introduced an intelligent CRT terminal for the banking industry and has developed an application-oriented, dual-language terminal with Farsi and Latin characters.

The Sir-1000 BTA banking terminal contains 2K to 16K of programmable read-only memory (Prom) for program and fixed format storage and 2K to 8K of random-access memory (RAM) for transaction entry, processing, queueing and forwarding, the company said.

The unit can be programmed to operate with any computer using any communication protocol, it added.

Keyboard layouts, condition indicator lights and audible signals are all designed for a bank's requirements, Megadata said.

Any low-, medium- or high-speed printer can be interfaced to the terminal; local storage can be accomplished by attaching a floppy disk, the company said.

Adherence to Requirements

The terminal provides for improved accuracy of banking transactions because it assures adherence to format requirements, automatically generating field descriptions and controlling field input, the firm added.

When interfaced with a proper switch, one Sir-1000/BTA can handle all bank transaction distribution networks, eliminating the need for a separate machine for each wire service, Megadata said.

The Sir-1000/BL bilingual terminal displays two character sets on the same display screen and requires that two languages be displayed with all the text-writing requirements for two totally different written languages, the company said.

Character representation is through a 10 by 15 dot matrix, allowing up to 150 displayable points for each character, it added.

Interfaces and communications protocols, including IBM 3270, Burroughs, Honeywell and bi-synchronous, synchronous, asynchronous and other communications capabilities are available, a spokesman said.

The Sir-1000/BL is also available for German, Spanish, French, Hebrew and Russian languages. The user also can draw his own character set, he added.

Thc Sir-1000/BL is priced from $3,950 to $7,500, depending upon capabilities and the Sir-1000/BTA is $3,850 to $6,750, Megadata said from 35 Orville Drive, Bohemia, N.Y., 11716.

Terminal Transactions

Micro-Based, 13-Lb Model 745 Extends TI Line

HOUSTON – A portable data terminal addition to the line of Silent 700 data terminals has been introduced by Texas Instruments, Inc. (TI).

Weighing 13 lbs, the Model 745 is said to achieve "briefcase mobility."

The portable terminal is expected to be used in remote sales order entry, inventory control, real estate services, insurance policy planning, financial analysis and similar applications.

TI also introduced the Model 743 KSR designed primarily for time-sharing and I/O console applications.

Both the Model 745 and Model 743 KSR include a TI microprocessor that replaces previous discrete components. The microprocessor is the key element contributing to the compactness and performance of the terminals, the firm said.

Each model also includes an Ansi standard keyboard with a calculator-style numeric key pad and features either half- or full-duplex operating modes, standard parity options, automatic paper loading and 30 char./sec printing.

The Model 743 KSR interfaces via teletypewriter, EIA or optional integral modem; the Model 745 has a built-in acoustic coupler.

Deliveries of the two models, available for lease or purchase, will begin in February. The Model 745 costs $1,995 and the Model 743 KSR is priced at $1,395.

TI is at Box 1444, Houston, Texas 77001.

ASC Sound Shields Quiet Teletypewriters

CLEVELAND – Acoustical sound shields from American Scientific Corp. (ASC) are said to solve the problem of loud noise from teletypewriters, line printers or other office machines.

The see-through Hushguard shields absorb, contain and dampen noise, reducing it by as much as 93%, ASC said.

A Hushguard Model 5533 for Teletype 33 ASRs and Telex 32 ASRs, for example, costs $259.50, with discounts for six or more units, ASC's Acoustical Division said from 26101 Miles Ave., Cleveland, Ohio 44128.

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Bits & Pieces

EMM Hikes Prices 4% to 8% For 360/370 Add-On Memory

HAWTHORNE, Calif. – Electronic Memories and Magnetics Corp. (EMM) has announced increases in purchase prices and lease rates for its line of IBM 360- and 370-compatible memory products.

The increases, which were effective Jan. 1, range from 4% to 8%, depending on the model, its capacity and the fixed-term lease duration.

Pricing for the most recently announced EMM model, memory for the 370/145 computer, is not affected by the increases.

"The increases reflect the accumulative effect of higher labor, material and interest expenses," according to an EMM spokesman.

EMM is at 3216 W. El Segundo Blvd., Hawthorne, Calif. 90250.

3M Enhances Gould Line

ST. PAUL, Minn. – The Beta Systems 700S and 700H from 3M Co. are enhanced versions of the Gould 700 line of computer-output microfilm (COM) recorders, according to a 3M spokesman

The firm acquired Gould's graphics systems group several months ago, the spokesman said.

The 3M versions have a higher speed tape transport (9-track, 45 in./sec, 1,600 bit/in.), compared with 22.5 in./sec in the Gould unit. The 3M versions also use a 16K processor, twice the size of the unit in the Gould systems, the 3M spokesman said.

The 3M Beta System 700S can output 14,000 line/min of COM data. The more expensive Beta System 700H model can output 19,000 line/min. Its stroke character generator also provides a higher quality image, the spokesman said.

Both recorders offer both 35mm and 16mm capability as options. Their 1.6M-word disk storage reduces job setup time by storing information on how to handle the data for a particular job, 3M said.

The firm said that it provides complete software and that the off-line systems are operator-programmable.

The 700S costs $137,000, and the 700H costs $152,000 from 3M at Department Mi5-83, Microfilm Products Division, Box 33600, St. Paul, Minn. 55133.

NBS Asks Input on Architecture

WASHINGTON, D.C. – The National Bureau of Standards (NBS) is soliciting input from professional societies, trade organizations and recognized experts in the field as to the direction computer architecture will be taking over the next several years.

The research is part of a cooperative program with the General Services Administration [CW, July 30] that could eventually require mainframe vendors to provide standard peripheral interfaces on the CPUs they sell to the Federal government, according to Thomas N. Pyke Jr., chief of the NBS's Computer Systems Engineering Division.

The NBS project team will be particularly interested in identifying the natural interfaces among the system modules within the computer systems of this time period, Pyke said.

This study should help the researchers find "interfaces that are candidates for potential standardization during this time period," Pyke said.

The study will probably be completed in six months, Pyke concluded.

With Data Entry at Source

Key-to-Disk Speeds User's Work Flow

SAN RAFAEL, Calif. – Fireman's Fund American (FFA) is managing to increase efficiency as it improves customer service on policy applications, renewals and claims.

This combination results in part from direct keying of source documents into a shared-processor key-to-disk system.

FFA can do this because of the intelligence in the key-to-disk system.

The insurance firm also gained from moving this processing power to the source of the data, its regional centers, and is now extending the concept farther afield to branch offices.

Implementation has followed a phased approach, with Four-Phase Systems, Inc. systems first installed in 1972 at the company's six regional centers where they replaced manual coding and keypunch systems.

Branch office installations began this year and are now nearing completion.

FFA needed a system to enter policy information and eliminate complicated procedures, including manual coding of statistical codes and the calculation of premiums.

The system had to allow local data entry at the processing center office and batch transmission via telephone lines to the home office for further processing.

Four-Phase IV/70 systems initially handled premium verification, renewals, changes and new applications for personal automobile policies.

Under the old system, an entry clerk at the regional center manually coded an abstract for each transaction with statistical coding for each coverage. These transactions were recorded on daily reports received from the branch offices.

The coded abstracts were attached to the daily reports; then all data was keypunched and verified. Batches of cards were tabulated for control, and card data was transmitted to the home office on batch terminals.

A master edit run on the central mainframes produced reject notices for erroneous entries, which were printed at the regional centers. Correction and reentry followed.

Under the new Terminal Entry System (TES), operators key-enter data directly from source documents, eliminating coding, keypunching and verifying.

Fill-in-the-blanks data entry, with prompts, formatted screens and audible alarm and forced error correction eliminates the need for verification of data. As records are completed, they are stored on the Four-Phase disk in batches, which are transmitted to the home office IBM 370 system daily.

A terminal entry conversion program generates statistical coding automatically and creates records identical to those produced by the old manual entry system. These are editied on the 370, and abstracts and rejects are transmitted back to the regional centers where they are printed.

Under the previous manual system, it took FFA six months to a year to train special coders to enter the correct statistical codes. Now operator training takes one week, and newly hired personnal reach full productivity in one to two months.

FFA's analysis of improvements in handling the premium-entry applications with TES showed a sizable staff reduction and a dollar cost savings.

Other benefits included reduction of the data input cycle by one to two days, a reduced error rate and the reduction of premiums not entered or entered on the wrong policy, faster new-employee productivity, elimination of cost and handling of punched cards and improved source document control.

The success with the personal automobile policies application led FFA to add personal fire, Workmen's Compensation and almost all other personal and commercial business to the Four-Phase systems. This year, claims entry is being converted to the source data entry system.

Seventeen Four-Phase Systems IV/70 processors are used for TES in the seven regional processing centers, supporting a total of 240 keyboard stations.

Each processor contains 96K bytes of memory, 5M bytes of disk storage and transmits data at 4,800 bit/sec to IBM 370/168s in San Rafael.

Now that source data entry at the regional centers has proven itself, FFA is extending the concept by moving data capture out to the 45 branch offices.

This will eliminate sending hand-generated source documents from the branches to regional centers.

This project itself is in two phases, the first to move data entry to the branches and replace installed hard-copy terminals, the second to move into true distributed processing by maintaining policy and claim record files on disk at each branch.

Conversational inquiry and retrieval of records will be used for information, loss analysis, claims coverage, verification, premium accounting and statistics. If information is not available on the local disk, the system will automatically access the San Rafael mainframe over communications lines and display the information at the operator's CRT in the branch office.

Branch office operators will then be able to access and update information.

Bulb Snatcher Saves the Day

By Bruce Ashby
Special to Computerworld

BLOOMINGTON, Ind. – What do you do when a light bulb burns out and you don't have a spare? Bulb snatch, right? Right!

Even when the burned-out bulb is part of the photoelectric reading mechanism on the Control Data Corp. (CDC) 501 printer at Indiana University's Wrubel Computing Center (WCC)?

Why not? Ed Morris, a third-shift operator at WCC, didn't let a little detail like that faze him; he went out to the parking lot and took the bulb out of the dome light on his car and screwed it in.

The 501 printed away from early Monday morning to Wednesday when a replacement bulb came in from CDC.

The bulb had first gone out on Saturday noon, but the WCC staff wasn't too concerned because there was an IBM 1403 printer to take up the slack and the weekend printing load was not that heavy.

Everything went well until 1:30 a.m. on Monday, when the 1403 went down too. With neither printer working, it was a choice of either closing down printing at WCC or finding a quick solution, which is what Morris did.

The story has a happy ending. Morris's bulb is back in his car's dome light, working fine.

Ashby is a staff writer for Random Bits, *a newsletter published at WCC.*

Seismic DP Measures Canada's Oil Resources

Special to Computerworld

CALGARY, Ala. – Within the midtown tower offices of this city, various oil companies use massive computer power to measure and evaluate Canada's oil reserves and determine methods for their exploitation.

The immense volume and complexity in processing seismic data is an everyday routine for Geodigit, a technical data processing service bureau for the oil industry.

Geodigit has been serving Canadian, U.S. and worldwide clients from its office here since 1968. Its computer center is said to be one of the most specialized Control Data Corp. (CDC) 6000 series computer installations in Canada.

But there's more than just a Control Data 6400 involved in Geodigit's seismic data services. Duncan Carswell, operations manager for the center, explained that the system includes various nonstandard components and has been updated with many features of CDC's Cyber 70 series.

"We've also installed specialized computers such as Univac 6130s for preprocessing data, products manufactured by our affiliated companies and equipment designed by CDC to meet special requirements," Carswell said.

Key element is a CDC matrix algorithm processor (MAP II), a unit that calculates seismic data at six times the speed of the computer's central processor. The MAP II functions through the computer's peripheral processors and contains memory, but is limited in programmable instructions.

It's the MAP II that enables the 6400 to handle four large seismic jobs simultaneously. The system's main memory of 64K words, with 250K words of extended core storage, holds seismic records and about 20 programs in core at the same time.

Historically, raw seismic field data was in analog form which had to be converted to digital for processing, then back to analog for displaying results.

Today the industry uses digital survey equipment to eliminate the first conversion and is standardizing on 9-track tape for seismic records. One-inch, 21-track tape is still used, however, recording data in from six to 12 formats.

This data is described in geophysical terms as samples, traces and records. Each sample contains up to 18 bits; from 1,000 to 3,000 samples constitute a trace; and there are usually 24 or 48 interleaved traces in a record. Average records will contain about .5 million characters of information.

In a typical marine survey, the instrument ship will acquire about 10 records per minute or as many as 64 records per mile. And since a survey covers up to 3,000 miles, one shipment of off-shore survey tapes sent to the center can contain more than 45 billion characters of seismic information.

The Geodigit experts work from observers' logs which detail how the records were obtained and contain special information for processing. Auxiliary tape channels carry additional information.

In Dynamic Market

System Gives Eyeglass Firm Clear View of Inventory

NEW YORK – An importer and manufacturer of eyeglass frames here stands ready to react promptly to the dynamics of the market with the aid of a computer it uses to coordinate product life with inventory.

"We create styles and initiate trends, but it is the people who pick them up," George Rich, president of Starline Optical Corp., said. "The computer will plot winners and catch losers before inventories get too large," he said.

Starline markets 500 styles, which translate into 8,000 different storekeeping units.

Sales Strength Data Vital

"Our greatest single need," Rich said, "is to obtain fast and reliable information on the sales strength of the new items we develop, so that we know whether to continue or drop them from our line.

"Some of the new styles become classics lasting three to five years, while others may achieve popularity only for a year or less."

If Starline is three months late in recognizing a shift in demand, it cannot reduce inventories in time. This is further complicated by the fact that Starline does not dump frames on a secondary market and, therefore, absorbs inventory excesses.

Conversely, it is just as important to have enough stock to fill the demand.

"Service is more and more complex because we cater to large numbers of optometrists and opticians who demand fast service," Rich explained.

"If our customers run into too many problems with deliveries, they are not going to push our line."

The practitioner expects delivery in three to four days after a patient selects a frame from his display board, he said.

So long as volume was small and easily summarized, a count could be taken manually. But, in the decade since Starline was founded, sales increased an average of 80%/year. While records could still be kept by hand, it would require a proportionately larger staff.

"There is a direct relationship between units processed and people," Rich contened. "To reduce the ratio, one needs automation."

Pressing Need to Automate

Selling nationally to some 20,000 optometrists and opticians through four regional offices, Starline found the need to computerize was pressing.

"The Univac 90/30 offers a maximum amount of flexibility. Our demands continually change and it is important that we can change tomorrow," Rich said.

For one thing, the 49K main storage can be expanded in increments five-fold. And, when and if the need arises, the four Starline regional offices can be connected on-line to the central computer.

As it is, branch inventories, monitored in the past by the offices themselves, will now be controlled by the computer.

The modular design of the system enables Starline to run applications as they are ready, rather than wait for the entire system to be programmed.

Also, as the system is expanded, reprogramming will be minimal. For instance, should Starline go on-line, it would merely program for that and not rewrite already-existing programs.

Implementing in stages permits Starline to computerize some jobs before the entire system is operational. This has a two-fold effect. One, it gives the company the benefit of computerization early in the conversion process. Two, it allows problems to be eliminated in the first stage before going on to the next.

The stages actually are four complete systems, beginning with post billing and associated reporting. This is to be followed by inventory control, sales reporting and accounts receivable.

Eventually, post billing will be replaced by prebilling, which, because of modular design, will be "dropped in" without reprogramming.

Management Reports

When inventory control becomes a computer responsibility, Starline hopes to considerably reduce if not eliminate out-of-stock situations.

For one thing, management will receive reports on the movement of each style by eye, bridge and temple size and color and act on reorders before stocks are depleted. Manually, according to Rich, it is next to impossible to forecast style needs by size.

Starline introduces 50 to 70 new styles per year. For the first six months, management will be furnished with weekly reports on sales so it can react immediately to consumer demand. After that, when a pattern has been established, the reports will be generated bimonthly.

Since eyeglass frames are fashion items and tastes differ around the country, Starline also will know what is selling where. "We always knew what was selling, but not by regions," Rich said.

"What we are looking for with the computer is a much faster reaction time on sales trends than heretofore, reducing the time from months to a few days," he concluded.

Sola Has UPS, Standby Power

ELK GROVE VILLAGE, Ill. – An uninterruptible power supply (UPS) and a standby power source, designed to provide clean, continuous electrical power for critical equipment during line power failure, have been introduced by Sola Electric Division of Sola Basic Industries.

In the UPS system, line power simultaneously charges a 120-volt battery bank and supplies power to an inverter. The inverter relays power through a transformer which regulates output voltage to within .25% of nominal and screens out line noise, Sola said.

In the event of line failure, the inverter continues to draw power from the battery bank. Since batteries and inverter are always connected, there is no switchover delay and no noticeable voltage fluctuations to the load, Sola said.

Standby Power System

The Standby Power system is designed for applications where transfer delay is less critical. A solid-state inverter and a battery bank remain isolated from the load until line power falls below a preset level.

When that limit is exceeded, a bypass switch transfers the load to the inverter, which begins drawing power from the battery bank. There is a power delay of approximately 200 msec during transfer.

The UPS system is offered in seven models covering single-phase operation from 1.2 KVA to 10 KVA output and three-phase operation from 7.5 KVA to 30 KVA output.

Standby Power systems are available in six models covering single-phase operation from 1.2 KVA to 10 KVA output and three-phase operation from 7.5 KVA to 15 KVA output.

The UPS systems cost from $2,240 to $24,450. Standby Power systems cost from $1,250 to $10,941.

Sola is at 1717 Busse Road, Elk Grove Village, Ill. 60007.

Deltec 15-KVA UPS Shows System Status

SAN DIEGO – The Model 5264A uninterruptible power supply (UPS) from Deltec Corp. is a solid-state 15-KVA unit whose indicator panel is said to give "a complete functional status of the system."

The panel uses multicolored LEDs instead of burnout-prone bulbs, the company said.

System control and logic circuitry are on printed circuit boards which plug into a "mother board." All test points can be easily accessed at this location, the company said.

The Model 5264A costs $15,200 from the firm at 980 Buenos Ave., San Diego, 92110.

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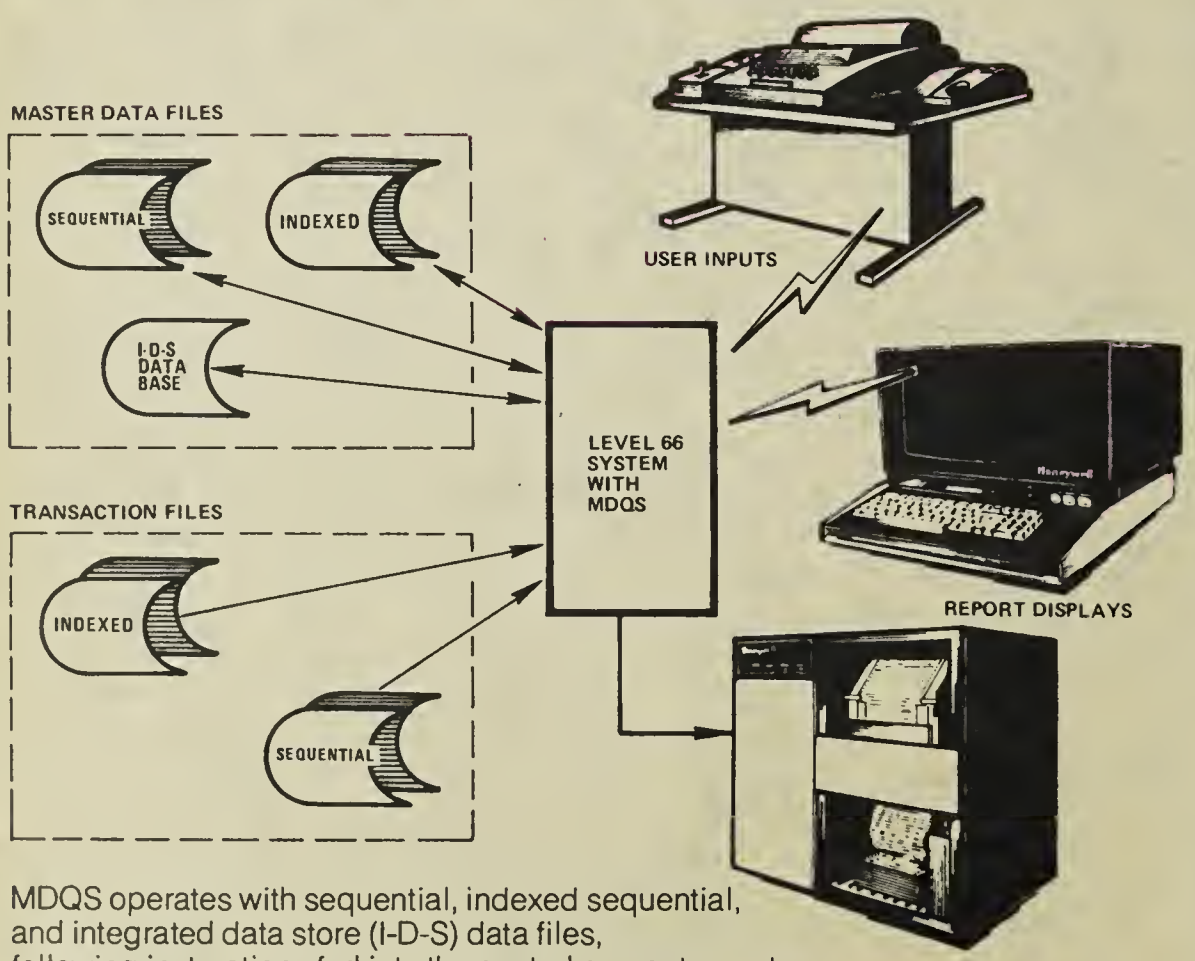
Q: How do you answer questions that weren't anticipated?

A: Easily. With Honeywell's MDQS.



MDQS operates with sequential, indexed sequential, and integrated data store (I-D-S) data files, following instructions fed into the central computer system from remote or onsite keyboard terminals.

Q: What is MDQS?

A: Honeywell's MDQS (Management Data Query System) is an advanced software system designed to generate information from your files in the form you need, when and where you need it. It was developed to meet those information requirements which, while requiring a timely response, are often unanticipated and nonrecurring.

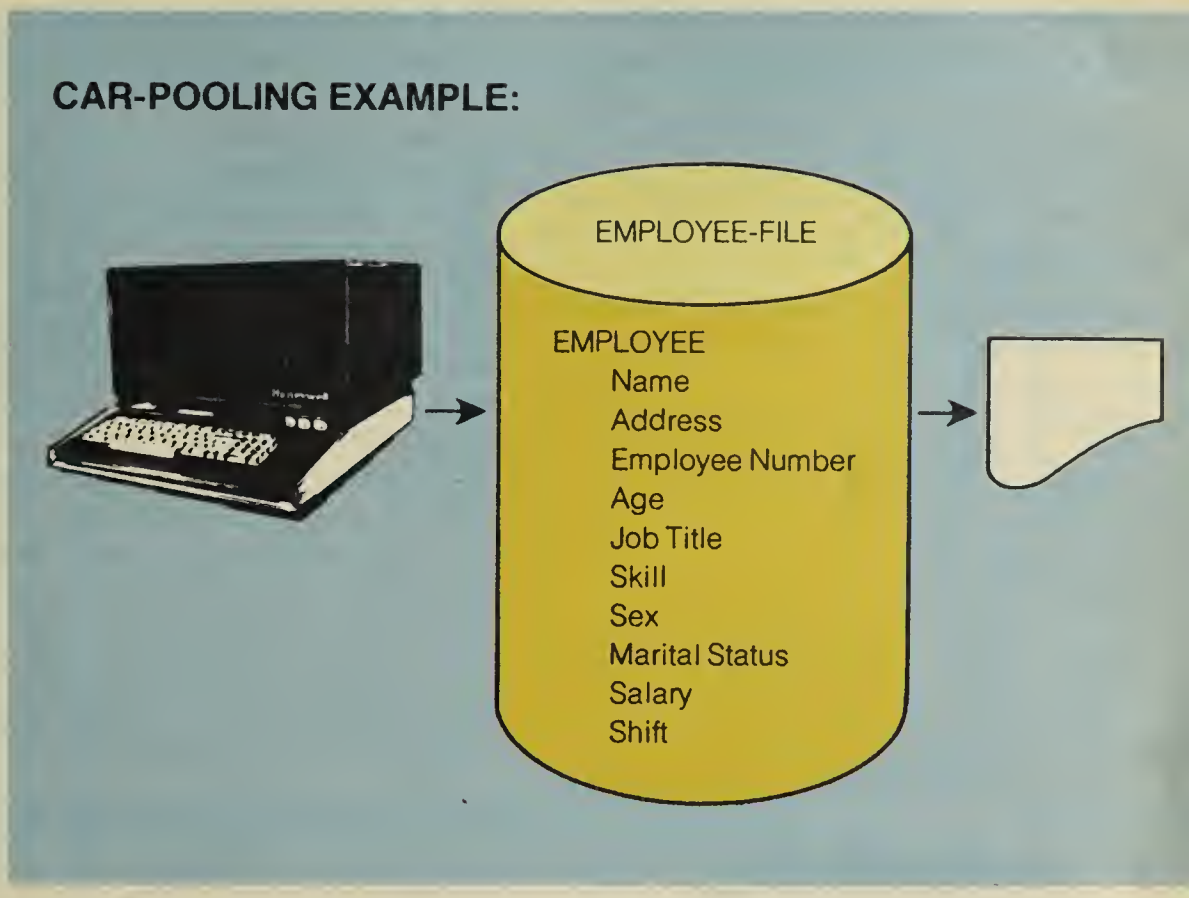
Here's how MDQS responds to those challenges:

- It eliminates the need for special program development, saving you the time and costs such development would require.
- It can be used by every level of personnel, from beginner to experienced computer user, from departmental employee to top executive. It allows management to use the computer and its resources for "what if" situations. And it allows operating departments to get working information immediately.

● The actual file interrogation and display of data can take place on a terminal in your office.
● It lets you create, update, manipulate, retrieve, or display the contents of a computer file, a series of files, or a data base. In precisely the format you specify.

MDQS handles all standard file types efficiently. And it has features that let you respond to complex, unpredictable situations.

MDQS is available now, as one of the capabilities of Honeywell's Series 60 Level 66 information systems and our General Comprehensive Operating Supervisor (GCOS). It's working today. It's also available to any user of Honeywell's nationwide DATANET-WORK service, so you can test MDQS on your files, in your office!



Q: What can MDQS do for me?

A: MDQS offers you a number of significant capabilities:
● Processing of existing GCOS user files. These may be sequential or indexed sequential data files, or integrated (I-D-S) data bases.
● Access to as many as 15 files, to fill a user request through just one information query.
● A language so simple that a report can be prepared with as few as two elementary commands: RETRIEVE and PRINT.
● An easy method to express selection criteria.
● Elective data destination—display on CRT terminals, printing on a hard-copy terminal or at the central site printer, or storage on a file.
● A precise report generation feature allowing you to produce one or more single or multilevel reports with page layout and data element editing control. Report and page headings can be generated automatically along with footing and control break lines, including subtotals and totals.
● Sorting with multiple keys for queries needing ordered report displays.
● File security, with extended protection to the data element level during the retrieval/update process.

Q: How can MDQS be used?

A: MDQS can be used in many ways.

A company can use MDQS to provide a corporate financial reporting system with reports customized to individual needs. It can use MDQS to prepare for labor negotiations by determining costs of various wage and employee benefit proposals. Hospitals can use MDQS to search patient medical history records before prescribing drug treatment.

The recent gasoline shortage created a need for information of the type MDQS is uniquely suited to provide. Industries and local governments across the nation began encouraging employees to form car pools. Many companies compiled lists to help their employees locate co-workers who lived near them and worked the same hours. This type of search and listing is not only easy for MDQS, but the privacy of information such as salaries is protected against unauthorized access by the system's security provisions.

For example: A listing to locate all employees working the first shift and living on Washington Avenue is needed. The report should be ordered in street number sequence. To do this, the terminal operator need only type:

```
RETRIEVE EMPLOYEE FROM
   EMPLOYEE-FILE
WHERE ADDRESS CONTAINS
   "WASHINGTON AVE" AND
   SHIFT=1
SORT EMPLOYEE ON ADDRESS
PRINT ON PRINTER NAME
   ADDRESS
```

The list will read:

NAME	ADDRESS
J.E. Smith	10 Washington Avenue
A.B. Jones	135 Washington Avenue
P.C. Brown	354 Washington Avenue
S.T. Thomas	624 Washington Avenue

Q: Is MDQS more than a data query and reporting capability?

A: MDQS is also a powerful procedural language.

- The system provides comprehensive arithmetic capabilities.
- Data file creation includes all the necessary data preparation functions such as validation and transformation.
- Master files or data bases can be updated from multiple transaction files.
- Data files can be easily restructured.
- The system provides the power and flexibility to write entire application systems. As an interactive computer development tool, it permits fast application programming. In fact, procedures can be developed and in production within minutes, instead of days!
- Tutorial assistance is included for novice terminal operators.
- Complete or partial procedures can be initiated by a single keyword entry from any terminal. Partial procedures can be completed at time of execution through user-supplied search conditions.

Q: Can you summarize the benefits?

A: Yes. MDQS:

- RESPONDS QUICKLY to a wide range of information requests.
- INCREASES PRODUCTIVITY of personnel using the system.
- COMPLEMENTS—rather than replaces—existing applications.
- DECREASES COSTS of system development and information processing.
- SOLVES a variety of SIMPLE or COMPLEX information processing tasks.
- OFFERS EASY ACCESS through simple commands.
- IS FLEXIBLE to allow processing of unplanned requests.

The Other Computer Company: **Honeywell**

Q: How can I get more information?

A: Call your local Honeywell sales office, or mail this coupon.

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Waltham, Massachusetts 02154

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Firm _____ Address _____

City _____ State _____ Zip _____ Phone _____

Alleviates Shortages

On-Line System Allocates Railroad Cars Efficiently

WASHINGTON, D.C. – To keep track of the 2 million freight cars in use in North America, the Association of American Railroads (AAR) is introducing an on-line dynamic inventory system.

The system "will improve freight car utilization and alleviate car shortages by allocating cars when and where needed," James A. Bailey, association vice-president, said.

AAR's system, called Telerail Automated Information Network (second generation), or Train II, uses 16 Memorex Corp. disk storage units to contain its data base. The disk storage array consists of seven 3670 disk storage units, each a dual spindle with a storage capacity of 200M characters.

In addition, there are nine Memorex 3675 double-density disk subsystems, each containing space for 400M characters.

The grand total of 5 billion characters of storage capacity is necessary to accommodate 300,000 car reports received daily, amounting to 9 million reports each month.

The AAR, an industry organization located here, is setting up the necessary communications network to provide railroads and other companies that own freight and tank cars, trailers and containers with information such as present and past location of cars, car-loading conditions and maintenance status on inquiry.

And, at the end of each day, the system will scan a master freight car file to develop statistical data on the use and disposition of the entire fleet of cars.

Substantial Savings

The switch from IBM disk storage systems to the Memorex independent peripherals resulted in substantial cost savings, Bailey said.

"We've replaced the IBM disks at a financial savings of about 30%. The reliability and capability of the Memorex equipment are certainly equal to the replaced gear," he added.

Train II operates over a combination of Western Union- and railway-owned dedicated circuits.

There are 41 terminals located in railroad computer centers around the country which are used to communicate to the central processing center here.

The system is made considerably more extensive by the fact that each of the major railroad members in the association also employs its own communications network. For example, Southern Pacific has 2,000 proprietary terminals.

Each of the 64 American railroads and two Canadian roads will report on all the cars which are interchanged, one railroad delivering to another and selected passing at certain stations, yards or checkpoints.

This information is then communicated through AAR's terminal to the central system here and placed on the disk storage units. The system will eventually account for almost 99% of all the freight cars in the U.S. and parts of Canada.

The old system (Train I) used by the railroads to monitor their rolling stock was not an on-line system. Information was collected and added to storage daily on a batch basis, from only certain junction points along the 330,000 miles of railroad.

Accurate, Faster Location

Train II will enable more accurate and faster car location and other information because there will be more complete reporting and on-line updating of the data files over the dedicated communications lines.

The system will store information such as: the commodity in the car, the recent history of its travels and its destination, the movement of the car from one road to another and the loading and unloading that has taken place.

Organization Seeks Papers on CAM Topics

ARLINGTON, Texas – Computer Aided Manufacturing – International, Inc. (CAM-I) has issued a call for papers to be presented at its international seminar in Atlanta on April 21-23.

Topics for abstracts include data base management, economics of computer-aided manufacturing (CAM), and CAM requirements planning.

Abstracts must be submitted by Jan. 30. Those who wish to submit an abstract should contact C.H. Link, CAM-I's executive secretary and general manager, at 611 Ryan Plaza Drive, Suite 1107, Arlington, Texas 76012.

Are you re-inventing the wheel?

A special report on *Software Packages* in the February 23rd issue of *Computerworld*.

"Do it yourself" can be bad advice for your programmers, when you can buy ready-made software that does the same job as well or better than the program you write yourself. A growing number of users have switched to packaged software for just this reason - and they have saved the time and expense of duplicating software for standardized applications.

We'll be analyzing these labor saving software packages in the February 23rd issue of *Computerworld*. We'll show you how to locate, select and evaluate the best software for your needs. Edited by Don Leavitt, this special report will include user experiences and tutorials on topics like these:

Information sources for locating packages -
Periodicals and references
DP professional groups
Trade shows
Selection criteria -
Definitions of various criteria
Comparison of techniques for evaluating system, utility and application packages
Trial periods - are they available, or of any value
Vendor-named users - are they of any value
Installation methods -
Packages installed by mail
Training and customization for other packages
Post-installation audit - does the user have this option, and can the package be returned
Paid in full vs. monthly lease - advantages and disadvantages of each.

If you're involved with programming and analysis at your installation, you should be reading this special supplement in the February 23rd issue of *Computerworld*. And if you're a software vendor, you should be advertising here. Don't miss the February 6 th ad closing. Contact your *Computerworld* salesman for all the details. Or call Judy Milford at (617) 965-5800.

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Mini Bits

Micro-Controlled System Handles Data Acquisition

MANHATTAN BEACH, Calif. – The microcomputer-controlled PAC-10 portable data acquisition, analysis and control system is available from Forth, Inc.

The system includes a graphics terminal, 512K bytes of floppy disk storage, a 16-channel multiplexed analog-to-digital converter and digital I/O.

PAC-10 was designed primarily for industrial quality control and testing and environmental monitoring applications, the company said.

Standard software includes a graphics package with contour mapping and three-dimensional projection display.

Prices start at $28,500 with application software. The firm can be reached at 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

MSM-10X Disk Holds 225M Bytes

SANTA CLARA, Calif. – A disk system with up to 225M bytes of storage and a 1.2 Mbyte/sec transfer rate that supports up to four disk drives in a stand-alone configuration is available from Microcomputer Systems Corp.

The MSM-10X system can be expanded to handle up to 15 drives, the firm added.

The microprogrammed controller integrated with the host computer's operating system is said to be plug-compatible with Hewlett-Packard, Digital Equipment Corp., Data General, Microdata and Interdata minis.

The MSM-10X costs $15,000 for the 40M-byte version and $29,500 for the 300M-byte model and is available from the firm at 3068 Kenneth St., 95050.

Monitor Based on SPC-16

COSTA MESA, Calif. – The Modular Command system from Esterline Electronics Corp. can handle energy management or access control tasks at a price 40% to 50% below an IBM System/7-based system, Esterline said.

Underwriter Laboratories approved the Modular Command system as a Class A fire protection system, a rating which could help users save on insurance premiums, an Esterline spokesman said.

Built around a General Automation SPC-16 minicomputer, the system can monitor smoke and fire detectors and temperature, pressure and humidity gauges as well, the vendor said.

A minimum system configured for a fire-protection application costs between $20,000 and $25,000 from the firm at 3501 Harbor Blvd., 92626.

For Vending Machine Firm

System to Keep Tabs on 'Little Money'

By Esther Surden
Of the CW Staff

GRAND RAPIDS, Mich. – A small business system is helping a vending machine firm here keep track of accounts payable, payroll and general ledger work.

But the Canteen Service Co. believes its most valuable application is yet to be implemented. The Burroughs B1700 system should soon be making sure the amount of money that comes out of each one of its machines jibes with the amount of soft drinks, candy and sandwiches that went in.

Little Money

"In the vending industry we have the problem of a lot of people handling a lot of little money," James D. Meyer, the firm's controller, said. "It is very necessary to control the product that is going into the machine and to make sure the right amount of dollars come out.

"The computer will help us keep track of this very complicated accounting," Meyer said.

Canteen services over 7,000 vending machines, some several times a day and others only once a week.

The firm also installs, maintains and rebuilds vending machines and participates in food preparation.

When Canteen first decided it needed computerized help, it hired a service bureau. When the need for in-house processing became apparent, the firm began looking at IBM, Burroughs and a local systems house.

Meyer said that in the past he had some experience with computers and, although he never had hands-on knowledge, this helped when making the decision to install one.

"We looked at the dollars," Meyer said. "How many times would we need to reprogram during our timetable, how many upgrades in major machinery would we need? With the new system we didn't need to change hardware as we adopted more applications and will have to do very little reprogramming."

The firm purchased a B1712 CPU with 32K bits of core memory, one on-line card reader/punch, four single-density disk drives for storage, a 180 line/min printer and a second off-line reader/punch for approximately $80,000.

The programs are running under the MCP I operating system, but Canteen expects to upgrade to MCP II in the near future. More core would be necessary to do this, Meyer added.

The firm purchased Burroughs' BMS package of programs to do the payroll, accounts payable and general ledger work. Canteen has a regular weekly payroll of 320 people processed centrally in its headquarters here and distributed to its seven branches in Michigan.

Over 250 checks per week are also processed out of the central office. Invoices are checked and input into the computer as well.

"Another factor about going with Burroughs," Meyer said, "was that we didn't require in-house programmers." One of the office workers who scored well on computer-related aptitude tests was given an opportunity to train on the system.

"This has worked out well," he noted, "and we are now anticipating adding someone else as we add new applications."

Programs written on an IBM System/3 and now run on a Singer system by the firm's parent company, Canteen Corp., should be able to run on the Burroughs system, he added.

Vendor support has been excellent, Meyer continued. "We've had one of Burroughs' technical people here once a week for nearly a year, helping us on."

Burroughs Extends B3700 Line With Entry-Level B3721 Model

DETROIT – Burroughs Corp. has announced an entry-level system for the B3700 line of business-oriented systems.

The basic B3721 includes a central processor with 100,000 bytes of memory, eight I/O channels with a 1.5 Mbyte/sec data path.

The system costs $3,170/mo on a yearly lease plan and $126,800 to purchase.

The system was not intended as an upgrade for present Burroughs users, the firm said. It will compete with IBM 370/125 models and Univac 90/30 systems, according to a spokesman.

When users upgrade to a basic B3741, the next system in the 3700 series line, they receive 8 million bytes of head-per-track disk and the disk controller, as well as an I/O band path of 3 Mbyte/sec, the spokesman added.

The B3721 lease price is $1,630/mo less than the B3741 and the purchase price is $96,700 less, he noted.

The addition of the system gives users a 3700 series model in the $7,000- to $10,000/mo range, including all necessary peripherals, the spokesman said.

All peripherals presently available for the 3700 series can be added to the B3721. The system is software-compatible with other models in the series, the firm said.

The system is available for immediate delivery, according to the Burroughs spokesman.

Lockheed Cuts Price Of System III Family

LOS ANGELES – Lockheed Electronics Co.'s Data Products Division has announced price reductions for each of the three Lockheed System III models.

The pricing represents a reduction of about 20% from previously announced prices, placing the System III within reach of IBM System/32 customers, a spokesman said.

The Model 1, which includes 16K bytes of memory, CRT/keyboard console, 5M bytes of disk storage, 100 char./sec printer and the disk operating system now costs $32,950.

The Model 2 has been repriced at $45,145 and includes a 32K-byte memory and one auxiliary terminal.

The Model 3, with a 48K-byte memory and five auxiliary terminals, now costs $70,895.

The models 2 and 3 have also been reconfigured to reflect customer preferences, Lockheed said. Both models, previously sold with two disk drives, are now configured with only one.

PDP-11/70 Processer Has Floating Point

MAYNARD, Mass. – A faster floating-point processor for its PDP-11/70 mini has been introduced by Digital Equipment Corp.

Typical runtimes for the FP11-C average between two and three times the speed of the previous PDP-11/70 processor, the firm says.

The FP11-C processor provides up to 17 decimal digits of accuracy. It was designed to perform more operations in parallel with the PDP-11/70 central processor than did the previous floating-point processor, thus increasing the total system's throughput rate, DEC said.

The FP11-C has 46 hard-wired instructions and its own set of six 64-bit floating-point accumulators. Since the floating-point processor is a separate processor, it can operate in parallel with the CPU, the company said.

The FP11-C costs $5,900 from DEC here in Maynard, 01754.

Primeaid:
fix a Prime quick with "Air Spare".

Should something go wrong with a Prime computer, the computer can help tell you what went wrong. Microverification firmware, for example, can test the logic of the entire central processor and indicate if and where a problem exists. For many

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Small Systems Reduce Firm's Line Charges, Overload

OSAKA, Japan – The high cost of Telex line charges and overloaded central computers have been relieved by a network of small business computers at Sumikin Bussan, Ltd., a Japanese producer of metals and machinery.

The firm generates massive amounts of sales and general accounting data at its 24 branches throughout Japan.

Before installation of the on-site minicomputer systems, this data was collected at each branch and transmitted by Telex to data processing centers in Osaka, Japan and Tokyo. Data was recorded on paper tape and batch processed at the centers.

As volume increased, the burden of Telex line charges grew and, eventually, the central computers became overloaded with data from the branches. Also, delay caused by the combination of low-speed Telex communications and off-line batch processing rendered much information relatively useless by the time it was disseminated to operating departments.

To solve its problem, Sumikin called on CJK Co. Ltd. of Tokyo, distributor for the data processing products of TRW Datacom International of Los Angeles.

Sumikin installed a network based on the Datapoint 2200 data communications system and the Datapoint 1100 diskette, with up to four disk storage elements providing 1M bytes of memory.

Meets Immediate Requirements

The small computers located at branch offices enable Sumikin departments to maintain local data bases and perform on-site processing to meet immediate requirements, the firm said.

Furthermore, data can be thoroughly edited and compacted before transmission to the Osaka and Tokyo centers. Thus, only correct, edited data is sent to the central computers.

The system installed by CJK consists of 25 diskette 1100 units, supplementing 10 Datapoint 2200 systems that were installed earlier. Datapoint units in branch offices communicate directly to 2200 systems in Osaka and Tokyo that sort and reproduce incoming information on magnetic tape that is then entered into the central computers.

Reduction in the volume of data sent from branches and the higher transmission rates provided by the Datapoint computers have resulted in a "drastic cut" in line charges, Sumikin said.

Also, the preprocessing and local support provided by the systems have relieved the load on the central computers and greatly improved efficiency.

Data for each sales or accounting transaction at a branch office is first filed in the disk memory units. Necessary paper work is then generated at the local office, while the edited and verified data is transmitted at high speed to the head office to update central files.

The 1100 units are installed at eight Sumikin offices, while the 2200 units are operating in seven offices.

Word-Processing Units From LCS Accept Electronic, Video Input

SPRINGFIELD, Mass. – Compu-Text Word-Processing Clusters from LCS Corp. are mini-based typing and text-editing stations using either electronic I/O stations or video input stations.

Text storage is on disk with a total capacity of as much as 4,000 typewritten pages, the firm said.

Optional printers for the cluster models include a 440 line/min printer and a 180 line/min printer.

A scanner that can automatically input typewritten copy prepared on a regular IBM Selectric typewriter can also be added. Floppy disk is available for archival storage.

The systems are fully compatible with the firm's shared logic systems, according to a spokesman.

Additional features include simple error correction, global editing, automatic footnoting, automatic page and section numbering, sorting and statistical typing.

There are three basic clusters. Compu-Text I includes one video unit and an electric printer and costs $23,500; Compu-Text II has one video unit and an electronic typing station and costs $25,000; and Compu-Text III contains two electronic typing stations and sells for $27,000. The firm can be reached at 31 Elm St., Springfield, Mass. 01103.

System Analyzes Labor Use

RIDGEFIELD, Conn. – A minicomputer-based turnkey production control system, designed to collect and analyze data pertinent to the costs and utilization of labor within a company, institution, government agency or other organization, was introduced by Capac, Inc.

The system, designated the Capac 101, consists of alphanumeric on-line terminals and a minicomputer. The terminals are installed and used at strategic points, such as in employee work areas, for the do-it-yourself entry of data to the computer.

The terminals are designed to accept data from perforated, credit card-like badges carried by employees. When an employee reports for work, for instance, he inserts his badge into a badge reader device mounted on the terminal and manually types a prescribed code on the keyboard.

The badge reader also reads standard computer punch cards which are usable in various work applications such as inventorying, project identification and so on.

Typical of management reports produced by the system are: employee attendance, cost analysis, job status, employee performance, man-hour accounting and job-cost accounting.

The Capac 101 is designed to facilitate direct input to a real-time data base management system.

The system also provides for the implementation of a plant incentive payroll plan allowing bonuses for productive workers.

A typical configuration with 32K words of memory, console CRT, line printer and 10 terminals costs about $70,000, including software, from the company at 470 Main St., Ridgefield, Conn. 06877.

Reports on B700, S/32 Available

CHERRY HILL, N.J. – Two reports evaluating the Burroughs B700 and the IBM System/32 are available for $10 each from Management Information Corp., 140 Barclay Center, Cherry Hill, N.J. 08034.

Boost your sales and profits in London this spring.

Computermarket exposition is an excellent way for you to boost the sales of your EDP hardware, software and services in the U K this spring. And because of Computermarket's economical turnkey exhibit packages, you can boost your profit at the same time.

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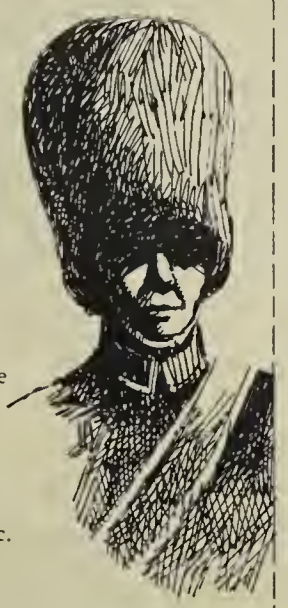
2. The U K is a large market for EDP hardware, software and services. In the London area, computer use is as extensive as in any large U S city. User and industry spending projections for 1976 predict a renewal of strong market growth.
3. Computermarket takes care of all logistics and promotion for the exposition for a package price. All you need to do is to bring your literature and equipment (if desired) to the exhibit site in London, and then concentrate on qualifying and selling attendees at your exhibit booth. The Computermarket professionals take care of all the rest. You are provided a booth, header sign with your logo, booth carpet, literature rack, chairs, and display stand. You can also pin up any graphics you would like on your booth backwall, such as blowups of your ads, pictures of your products, covers of your sales literature, etc.
4. You will be in good company at our London Computermarket show. The following is a list of some of the fine companies who participate in the London Computermarket.



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Computermarket provides two economical exhibit packages to choose from in participating in the London exposition. A deluxe, 120 square foot booth module with a complete array of booth equipment alternatives is available for $1950. A standard 48 square foot display/booth, especially suitable for presenting software, services, and small hardware units, is available with a full range of services for $720. To reserve your booth requirements, and obtain full details on the exhibit services for the 1976 London Computermarket, just fill in the coupon. Or you can contact Computermarket directly by calling Michael Young in London at Computerworld Publishing Limited, 140-146 Camden Street, London NW1, telephone 01-485-2248.

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For complete documentation, write Diablo Systems, Inc., 24500 Industrial Boulevard, Hayward, California 94545. (415) 783-3910. In Europe, Diablo Systems, S.A., Avenue de Fre, 1180 Brussels, Belgium.

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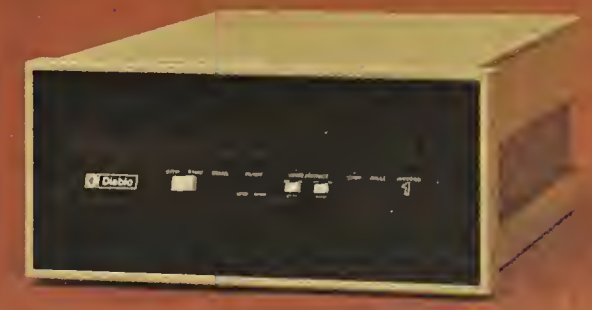
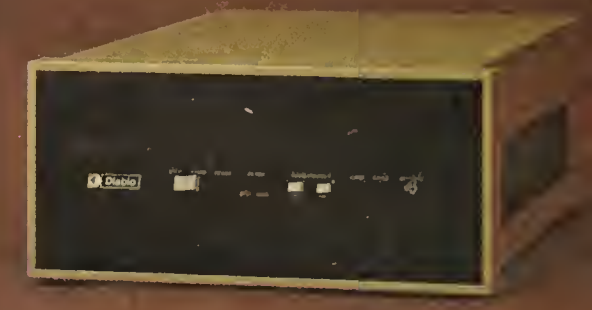


M413F, 53.3 megabytes
1 removable 2315-type cartridge
3 fixed disks



M410T, 13.3 megabytes
removable 5440-type cartridge

M411T, 26.6 megabytes
1 removable 5440-type cartridge
1 fixed disk

M412T, 40 megabytes
1 removable 5440-type cartridge
2 fixed disks

M413T, 53.3 megabytes
1 removable 5440-type cartridge
3 fixed disks

For Electronics Firm

System Calculates Imported Goods' U.S. Money Value

NORTH ANDOVER, Mass. – Fluctuating fortunes of the pound, lire and other foreign currencies have been a persistent problem in American industries with contacts overseas, but one firm has found a way out by using a minicomputer to determine U.S. money equivalents on those items it must import for expanding operations.

It's only a matter of introducing the latest currency information into the programmed minicomputer and the system "promptly comes up with the correct unit price," Sid Hopper, financial manager of the Alco Electronic Products, Inc., said.

A supplier of subminiature switches and related front-panel components for electronic equipment, Alco does substantial business overseas. Foreign exchange calculations, however, are only part of the mini's daily tasks.

Other Tasks

When an order comes in from one of the firm's 2,000 customers, wanted items are entered upon the system's video display terminal by buyer's name and quantity. The computer sorts through its disk-stored inventory, locates the item and adjusts the inventory level.

The system gives a clean, readable ticket, and the warehouse workers can quickly move to the correct bin. One fringe benefit, according to the company, is increased order efficiency that has enabled Alco to keep as few as four full-time warehousemen, despite expanding business.

If there is a rush on a particular item, the minicomputer routinely adds those out of stock to the back-order list to be filled as soon as bins are replenished. But if a section of the order can be filled immediately, the mini indicates just how much can be sent, with the remainder going to back order, a spokesman said.

Previously, the firm depended upon a mechanical accounting machine with punched tape that was sent to an outside processing center. Time was lost because the center was too far away and the data too slow in process. New orders were delayed and back orders piled up.

Hooper spent a year checking out in-house and on-line computer systems, visiting over 10 installations before the firm settled on the Digital Equipment Corp. Datasystem 340 early in 1974.

The IBM System/3 Model 6, Singer System 10 and Honeywell Model 58 were considered before the field was narrowed to the DEC mini. The firm chose DEC because the company was able to supply a modularly designed system and could fill Alco's service needs, a spokesman said.

Installed here is a PDP-8/E central processor with two RK05 disk drives, a VT05 video display terminal and a 60-line/min printer.

With the mini, the company can now give firm assurance to the customer who wants an item on a certain future date.

Mini Tests Tires For Uniformity

AKRON, Ohio – A minicomputer on-line to tire-grading machines helps one manufacturer here test for product uniformity.

Technicians at Firestone Tire and Rubber Co. manually recorded Tire Uniformity Optimizing (TUO) machine measurements and batched them for later off-line calculations prior to acquiring their Hewlett-Packard (HP) 9600 scientific measurement and control system.

"With the 9600s, test result trends are detected as soon as they develop," H.P. Weyand, Firestone's manager of field service engineering, said.

The 9600 systems are used in Firestone's U.S. and Canadian tire plants. From four to 12 TUO machines are monitored by a 9600. In a larger plant, up to four of the systems are operated as satellites by a host 9600 in a distributed environment.

The host system precludes the need for a disk storage subsystem at the satellites and reduces the load on satellite core storage.

Trend Data Available

In Firestone's uniformity-optimizing program, various statistical averages and trends within tire samples are made available in hard copy and displayed on video terminals.

"If a trend develops, it usually can be traced quickly to a specific area of the tire manufacturing process," Weyand added.

When tested, a tire is accelerated against a "road wheel," a 34-in.-diameter wheel mounted on load cells. The road wheel transmits the forces received from the tire to strain gauges in the load cells.

The ensuing electrical representations of forces are amplified and filtered in a proprietary "front-end" controller designed by Firestone. The signals are digitally converted and analyzed in the 9600.

Magnetic tape output, compatible for data entry on a System 370, is used for continual yield studies.

The minicomputers are also used to monitor the calibration of TUO machines. In repeatability tests, a sample of tires of known force vibration are run in succession on a specific TUO to test its consistency correlation with other machines.

As a result, tires are tested on all TUOs at virtually identical calibration.

Micro Dictionary Available

NEWTON, Mass. – A microcomputer dictionary and guide is available from Cramer Electronics, Inc. for $14.95.

The 600-page guide covers the latest terms and concepts in microcomputer and computer technology as well as abbreviations, acronyms, symbols and formulas, the firm said from 85 Wells Ave., Newton, Mass. 02159.

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A list of current seminars is given below. To register for any seminar, or if you'd like more information, just check the appropriate box and send in the coupon.

How to Increase Programming Productivity
A 2-day seminar for technical managers on new analysis, design, and implementation methods and how to manage them better. Led by John W. Brackett, PhD, Vice President of SofTech, Inc., and Prof. Clement L. McGowan of Brown University. Fee: $300, including continental breakfasts, luncheons, and all course materials. $250 for additional registrants from the same company. Schedule:

New York	**Essex House**	**Jan. 26-27**
Chicago	**Hyatt Regency O'Hare**	**March 8-9**
Wash., D. C.	**Stouffer's National Center Inn**	**April 6-7**

Legal Tools for Computer Contracting and Protection
A 2-1/2 day seminar that shows you how to increase your advantage in dealing with vendors that supply your installation. Includes discussion and review of your own contracts. Led by Roy N. Freed, the nationally known lawyer, author and educator in the field of computer law. Fees: $325, including continental breakfasts, luncheons and all course materials. $275 for additional registrants from the same company. Schedule:

Wash., D.C.	**Marriot Crystal City**	**Feb. 4-6**
Orlando, Fla.	**Sheraton Towers**	**Feb. 18-20**
Seattle	**Airport Hilton**	**May 19-21**

Performance Evaluation and Improvement
A 2-day seminar on measurement techniques that are designed to save your installation money. Led by Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement and improvement.* Fees: $250 per registrant, including continental breakfasts, luncheons, and all course materials. Schedule:

San Francisco	**Dunfey's Royal Coach**	**Jan. 19-20**
New York	**Summit Hotel**	**Feb. 9-10**

Data Communications Course #1010 -
Practical Data Communications Systems & Concepts
A 2-day seminar on the newest advances in data communications, including SDLC, DDS, new tariffs, equipment characteristics, and the impact of satellite carriers. Led by Dr. Dixon Doll, Teleprocessing consultant. Fees: $350, including continental breakfasts, luncheons, and workbook and reference materials. $300 for additional registrants from the same company. Schedule:

New York	**Essex House**	**Jan. 26-27**
Chicago	**Hyatt Regency O'Hare**	**Mar. 15-16**

Data Communications Course #1020 -
Advanced Teleprocessing Systems & Concepts
A follow-up to course #1010, this 3-day seminar emphasizes techniques that minimize operating costs in commercial data communications networks. Also led by Dr. Dixon Doll. Fees: $450, including continental breakfasts, luncheons, and an extensive set of customized course materials. $400 for additional registrants from the same company. Schedule:

New York	**Essex House**	**Feb. 23-25**

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Cost Savings Just One Advantage for Firm With Mini

SUNNYVALE, Calif. – To obtain "better information at lower cost," a microfilm manufacturer here chose a mini-based system to handle its business functions.

Xidex Corp. uses its Basic/Four Model 400 system for sales order entry, accounts receivable, sales analysis, finished goods inventory control (of some 2,000 items), accounts payable, labor distribution and budgeting.

All of these operations were previously carried out in the accounting office on a manual basis, except for labor distribution and accounts payable, which were farmed out to a service bureau.

For an outlay of about $900/mo, Xidex has avoided adding two clerks to its five-person accounting team and saved service bureau costs that would be running at least $1,500/mo, the firm said.

Direct money saving is only part of it, E. Ray Gamble, controller said. "Information is more accurate and timely. The computer provides a structure which enables the five clerks to keep continually caught up with day-to-day activities rather than fall weeks behind, which used to be the case."

New Breakdowns

The system has permitted Xidex to initiate a number of new types of accounting and marketing breakdowns – such as customer histories – not feasible in the past.

"Now that we have accounting and marketing applications on the mini," Gamble said, "we want to install a manufacturing system which represents double the effort already expended. This may involve upgrading to a Basic/Four Model 600 in the near future."

Among the manufacturing applications intended are bills of material, raw material inventory control, purchasing, production performance and yield reporting.

In selecting a minicomputer system, Gamble said, he reviewed "virtually all" those available and narrowed the field to three, from which he picked Basic/Four.

The mini is simple enough to operate so regular bookkeeping and accounting staffs can be quickly trained to use it, a spokesman said.

The unit consists of a typewriter-style keyboard, a magnetic disk unit to store information and a printer.

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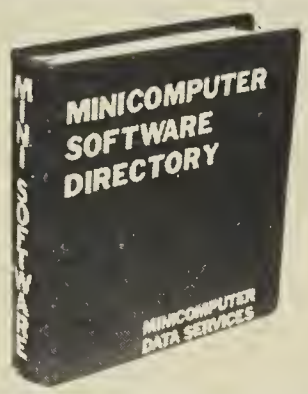

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Ask a salesman who leased a 300 from us about a year ago. He dropped his unit off a desk during transmission, creating a shock that was probably harder on our friend than our machine. The 300 lost two characters, then continued operating as before.

Seemingly determined to destroy our unit, this same fellow then put this same 300 into the trunk of his car. An unscheduled rainstorm filled his trunk with muddy water, giving our machine a thorough bath, not to mention a perfectly good excuse for never working again.

The 300 came through with shining, if somewhat muddy, colors. Plugged in, it operated beautifully.

If you'd like to know more about a terminal that can stand up in this tough world, get in touch with Charles Kaplan or Shirley Newman at (201) 261-6800. Computer Transceiver Systems, Inc., East 66 Midland Ave., Paramus, New Jersey 07652.

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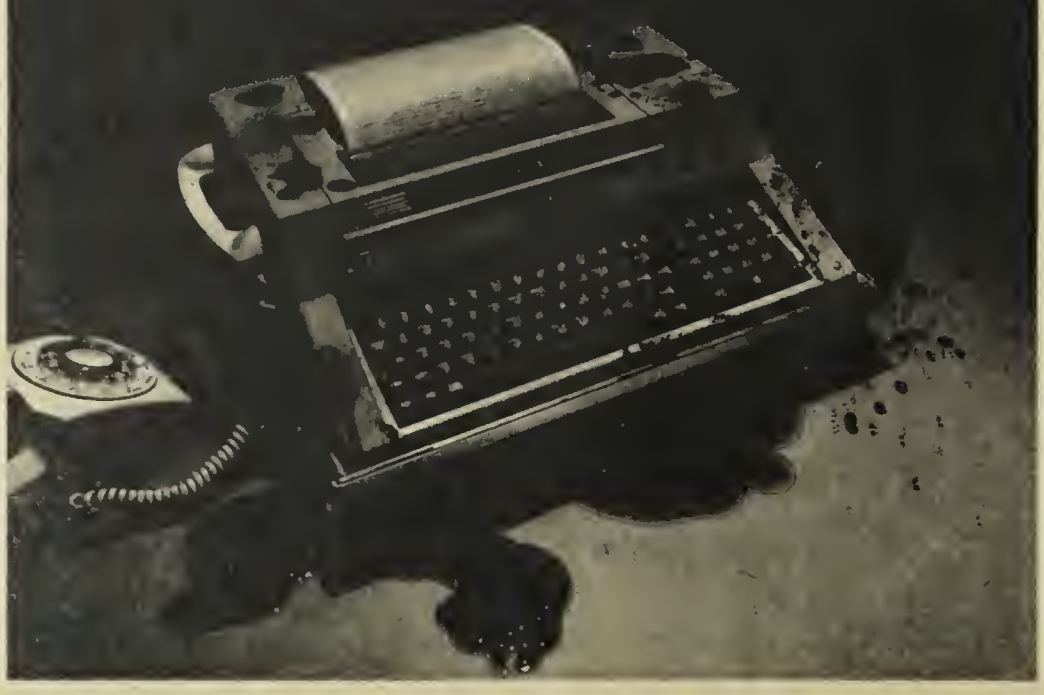

EDS Microprogrammable Processor Designed for Nova-Type Machines

IRVINE, Calif. – Educational Data Systems (EDS) has developed a microprogrammable processor, the Micro-N, for use with any Data General Nova-type minicomputer.

The system brings a microprogramming capability to the Nova which can be used to implement user-defined, procedure-oriented macros.

In addition, one or more Micro-Ns can be used in one Nova to obtain a parallel, multiprocessing system and the system provides Novas with decimal floating point.

The capabilities of the Nova are extended by performing any process for which a microprogram can be written, in parallel with normal processing of the Nova CPU and at higher speeds.

Applications include floating-point arithmetic, either binary or decimal, character string processing, graphics control, matrix operations, fast Fourier transforms, spectral analysis, sorting and control of special devices.

A Micro-N assembler (which runs on the Nova computer) and the ability to operate microprograms from either the Nova's core memory or the Micro-N's programmable read-only memory (Prom) facilitate the writing and debugging of microprograms, EDS said.

The Micro-N occupies one slot in the computer chassis and includes a high-speed processor with four accumulators, up to 4K words of Prom to hold microprograms and up to 64 words of random-access memory (RAM) for temporary scratch-pad storage.

Both the Prom and RAM are bipolar devices with access times of about 50 nsec, the firm said.

The processor is driven by a 20 mHz clock and most operations take 100 nsec, including instruction fetch and execution, EDS added.

Proceeds in Parallel

One or more Micro-Ns can operate on the data channel in parallel with the standard CPU of the Nova. The Nova initiates execution of a microprogram by an output instruction. The Micro-N then proceeds in parallel with the Nova CPU, accessing macros and data from the Nova core via the data channel.

The ability to read information via data channel can be utilized to implement a macro capability with the Micro-N.

The Nova program, by means of I/O instructions, hands the Micro-N an EXECUTE MACROS command including a command identifier (1 byte, for example) and a pointer to a place in core where the first macro is stored. The Micro-N then reads the macro and any additional parameters required from successive words and executes the appropriate procedure.

These additional parameters may include pointers to operands elsewhere in core, etc. When finished, it reads the next macro from the macro string.

Finally, the last entry in the macro string will be an "End Macros" code which causes the Micro-N to notify the Nova it is done. The macro string capability may be used to evaluate entire algebraic expressions with a single Nova instruction, EDS noted, adding it is even possible to microprogram the RAM as a stack and to implement Push and Pop macros.

Because the Micro-N has a variable word length capability, it is well suited to data processing tasks for data in other than 16-bit words, for which the Nova is not efficient, EDS said.

Byte manipulation is a typical example, according to the firm. Even such a simple task as Move Byte String, in which the word boundaries are different in source and destination, is done more efficiently by the Micro-N than the Nova, EDS said.

The Micro-N reads the entire string into its RAM (or as much as fits at one time) using successive data channel outputs and then, after moving the appropriate RAM address pointer by 1 byte, re-stores it – again using successive data channel inputs.

Table Lookup

The Micro-N can be used in table lookup, the firm said. An efficient way to do this is to fill the Micro-N's RAM with entries to be looked up because the Micro-N can then search through the table which is stored in Nova core and compare each table entry with all the entries in its RAM, thus minimizing the number of data channel transfers required.

The microprogrammable Micro-N is available in two models, the Model 400, with 16 words of RAM, and the Model 400-R, with 64 words of RAM.

EDS also offers a floating-point decimal arithmetic version of the Micro-N. This unit is also available with 16 words of RAM (Model 400-P1) or 64 words of RAM (Model 400-P1-R).

The microprogrammable Micro-N Model 400 is priced at $2,600 and the Model 400-PI at $3,500, EDS said from 17981 Sky Park Circle, 92707.

GSA Plans Reduced Involvement in DP Procurement

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The General Services Administration (GSA) will soon stop issuing DP purchase permits to all federal agencies on a case-by-case basis in favor of blanket purchase okays issued to "highly DP-oriented" agencies.

Under the new scheme, a blanket "delegation of procurement authority" (DPA) will be issued to those agencies on an annual basis. GSA contracting specialists will then monitor the results of agency-run bidding to assure fair competition.

The change is part of a comprehensive reorganization aimed at decentralizing GSA's purchasing responsibility, Theodore Puckorius explained in an interview here recently.

Puckorius, who took over control of the GSA's Automated Data and Telecommunications Services (ADTS) last May, said GSA wants to reduce its involvement in DP purchasing by 80% and, in the future, handle only the largest and most complex system buys.

Other changes Puckorius wants to see include cutting back GSA's federal DP centers – which in the past have functioned as government-run service bureaus competing directly with industry-operated services – and broader use of DP service contracts.

This is part of what the agency's telecommunications service contract is all about, according to Puckorius. "We don't want the agencies to continue buying equipment and setting up processing centers if industry capability exists that can satisfy their needs," he explained.

Puckorius has also consolidated the agency's DP expertise in his service by bringing the GSA administrator's DP advisory staff under his own authority.

For this he had to give up adminstrative authority over GSA's 10 regional service centers. That, he feels, was appropriate since the service centers will be limited to GSA internal processing in the future.

Philosophies Crystallizing

"We are finally starting to crystalize GSA's operating philosophies and apply some business practices to the management of this agency," he said.

"When I came to GSA we had a lot of policies that evolved as a reaction to problem situations. These policies were disjointed – the pieces did not fit together to make a whole," he recalled.

"Now we've started to do some planning," he continued. "We've established a set of objectives and we're working on a strategic plan to accomplish these objectives.

CW Photo by N. French
Theodore Puckorius

"Once that is complete, we'll develop a set of new policies to implement the overall plan," he said.

(Continued on Page 42)

Report Says U.S. DP Sites to Reach $60 Billion in '80

By Nancy French
Of the CW Staff

CAMBRIDGE, Mass. – While general-purpose systems are not expected to move much faster this year than they did last year, sales will improve in the latter years of the decade to boost the value of domestic installations to about $60 billion in 1980, according to a study completed here recently.

A new IBM product line, anticipated in the latter years of the decade, followed by new offerings from competitors, will give users the new easier-to-use products they are waiting for, according to Arthur D. Little (ADL), a management consulting firm.

Authored by ADL's Frederic Withington, the report estimated the value of domestic installations of general-purpose computers in 1975 at $40.8 billion.

In his annual five-year outlook, Withington estimated the gross value of general-purpose computer shipments in the U.S. dropped by 22% in 1975 to $6.4 billion from a record $8.2 billion in 1974.

However, the cumulative value of installed equipment will increase by $4.6 billion since 1975 returns will amount to only $1.8 billion, the report indicated.

World Outlook Healthier

However, ADL's 1975-80 outlook for the world computer industry included a somewhat healthier growth rate for associated equipment.

By 1980, 60% of all mainframes will be connected to networks or other CPUs, Withington said, adding that unit shipments of terminals will grow at a rate of 17% compounded annually, from 1975 to 1980.

Despite the drop in the cost of electronic gear, the annual growth rate of terminal sales in dollars will average about 22%, largely due to the complexity of equipment users are ordering, he said.

The growing trend toward distributed processing is difficult to quantify since many CPUs are being used part time as stand-alone systems and the balance of the day for local data entry or backup, he explained.

Abroad, ADL reported U.S. manufacturers increased their share of foreign shipments last year. In 1975, gross shipments by all manufacturers overseas totaled about $5.2 billion.

U.S. manufacturers claimed $4.3 billion of this, off 19% from the $5.3 billion in equipment shipped in 1974. However, non-U.S. vendors fared much worse, with shipments of $5.2 billion, down nearly 50% from about $7.1 billion in 1974.

U.S. companies' combined share of 1975 placements abroad amounted to about 85% of total foreign shipments, compared with 71% in 1974.

Withington estimated the 1975 year-end value of U.S. manufacturers' installations abroad was $25.4 billion, or 72% of the total foreign installed base of $35.4 billion.

U.S. manufacturers will have more than $40 billion worth of foreign installations by 1980 or 68% of all foreign installations, for an average growth of about 10% per year. The total non-U.S.-supplied base will increase to about $60 billion in the same time period, he said.

Competitors Out of Phase

Recession-induced customer postponements of some computer deliveries is only partially responsible for the declines last year, according to Withington.

A second reason is that the industry's chief competitors are "out of phase with each other in the introduction of major product improvements.

"The volume of computer industry shipments is controlled more by the introduction of new generations of large and giant machines than by economic conditions," the ADL analyst said.

"Machine size is a factor because it takes many more small- and medium-size computers to influence volumes in the billions of dollars.

"A big growth spurt follows large and giant machine introductions. Then it tapers off until the next generation.

"Right now the industry is only gradually emerging from a slow growth period because IBM has yet to launch a new generation of computers," Withington said.

"With its demonstrated technical competence and marketing skills, we can be certain IBM will catch up with the other principal manufacturers who have already introduced new equipment. Until that time, the industry will be slow, since IBM dominates it," he said.

Dominance of world computer markets by U.S. full-line manufacturers will continue over the next five years, he predicted. Their long-range prospects have strengthened as foreign competition has dwindled to only ICL, Siemens and Fujitsu.

"However, by 1980, the world market will appear to be more in the hand of U.S. companies than it actually will be. Many specialized and regional affiliates will be included under the general-purpose manufacturers' umbrellas," he said.

The key incentive for manufacturers to enter consortium-like arrangements is the high cost of worldwide marketing and service support for a full range of computer systems and software, he said.

"General-purpose computer manufacturers will increasingly affiliate with functionally specialized and indigenous manufacturers while retaining product uniformity via product line specification and system programs," he explained.

"The message here is that U.S. industry will dominate the market in the U.S. and worldwide. However, actual ownership and profits will be spread around," he explained.

Term Outmoded? – Part 2

Search Continues for Mini Definition

By Molly Upton
Of the CW Staff

Minis might be defined by the three-dimensional segmentation that is characteristic of the mini market, rather than selecting one set of criteria, Honeywell Information Systems' (HIS), William Shipman, national marketing director for minicomputers, said.

The market can be delineated according to channel of distribution, such as OEM, system builder or end user; industry of the user; or functional classification, such as free-standing DP system, computer system support, data monitoring and control or data conversion.

Honeywell generally excludes small general-purpose computers like its models 61/158 or 61/60 or IBM System/32 and System/3 from its definition of minis, he said.

It considers as minis its System 700 models based on the HIS 716 type CPU, which includes models 725, 735, Datanet 700 and the Series 16 using the 316-type CPU such as models 1602 and 1603.

William Rosser, Interdata Corp.'s director of corporate planning, observed one way to approach the problem of defining a mini is by what firm manufactures it or by setting up a series of classifications such as micro or 12-, 16- or 32-bit machine or to compare units with certain model numbers, "like 370/145."

Another Breakdown Needed

The word mini will probably continue to be used in a general sense to refer to the "traditional minicomputer market. But it will lose its effectiveness certainly. I think we'll have to go to the use of the term computer and some other kind of breakdown," Rosser said.

NCR has over 16,000 mini-based systems in the field, using the same basic processor, a spokesman observed.

NCR's mini is used in at least eight general- and special-purpose products ranging from the Century 8200 small business system to the 755 financial application preprocessor, including the 399 series of small accounting-oriented business system and intelligent terminals, he added.

The chief characteristics of minis compared with mainframes are smaller size, lower cost and the ability to be adapted to virtually any systems-related task, said Roy L. Phelan, NCR's vice-president of research and development.

Dave Stein, Computer Automation, Inc.'s vice-president of marketing, said he has found that the key to correlating market research reports on minicomputers is to use the following cost breakdown: microcomputer from $50 to $500, micromini from $500 to $5,000, a mini from $5,000 to $50,000 and a megamini or midi from $50,000 to $500,000.

Using this scheme, he said, he could make meaningful correlations with most of the market research data, he said.

One of the more meaningful categories for current market analysis is to divide mini-based business systems into interactive and batch, he said.

Any definition can be only a snaphot of the term's meaning as it is perceived at the moment, a Hewlett-Packard Corp. (HP) spokesman said.

Like Digital Equipment Corp., HP has no official definition on which all HP people must concur.

Two viewpoints of the computing spectrum of minis were presented by Richard E. Hackborn, engineering manager of the

(Continued on Page 42)

GSA Plans Greater Agency Involvement in Purchasing

(Continued from Page 41)

Puckorius, who came to GSA from Lester B. Knight, a Washington, D.C., management consulting firm, contends that running a government department should not be very much different from operating a business.

"In business, success is measured in terms of profitability. At GSA, profit is measured in terms of 'cost avoidance,' " he explained. "When we get better goods and services for the government at a reduced cost, we are successful."

Puckorius holds little hope for passage of the multiyear leasing bill which, though introduced in Congress for the past two years, has gone nowhere.

The bill was designed to save the government millions of dollars annually by giving federal agencies the authority to sign long-term equipment leases.

At present, agencies may sign contracts for a maximum of one year at a time because they are not authorized to commit funds which have not yet been appropriated by Congress, and that occurs only one year at a time.

"It's just not a priority question with Congress," Puckorius said, "but please understand I'm not criticizing the Congress on this. It's concerned with billion-dollar issues. We're just talking about saving millions."

Rather than continuing to battle for multiyear leasing, Puckorius said GSA will try to work around the problem by increasing the revolving Automated Data Processing (ADP) fund.

"The concept behind the original Brooks Bill was that all DP procurement would flow through the ADP fund. If the fund were of sufficient size, there would be no need for multiyear leasing," he said, "but it's not."

The fault lies with both the Office of Management and Budget, which "has been hesitant to expand the ADP fund," and on ADTS because "we haven't been aggressive in putting together a well-thought-out plan for capitalization," Puckorius said.

One solution would be to transfer ownership of all government-owned computers to ADTS, borrowing against that equipment from the Treasury Department and then putting the money into the fund, he said.

A second solution would be partial capitalization through limited equipment transfer and borrowing from Treasury, combined with a request to Congress for a larger fund appropriation.

"Asking Congress for $100 million for computers would be a lot more difficult," he added.

At Puckorius' request, GSA officials have also rewritten the proposed mandatory requirements contract for minicomputers into a plan allowing for many "indefinite quantity" contracts.

While the contracts are "indefinite" as to quantity they do call for a minimum as well as a maximum order limit, which allows manufacturers to quote a better price without getting themselves into a contract that would exceed their manufacturing capacity, according to Puckorius.

This plan is still under fire from minicomputer manufacturers who believe winning such a contract does not actually constitute winning anything. Under the circumstances, some have said, they can't give any price breaks.

Search for Definition Of 'Mini' Goes On

(Continued from Page 41)

HP computer group, and Dave Sanders, product marketing manager for HP 3000 and 2000 Access systems.

Hackborn said the computing universe begins with the microprocessor costing from $20 to $200. The next step is the OEM minicomputer, or CPU on a board, which, without memory, costs between $300 to $3,000. These units are input/output-oriented in contrast with the larger minis, which are memory-oriented, he observed.

The lowest priced type of computer with data management capability, either sequential, random access or both, is the traditional systems minicomputer, he said.

CPU alone, without memory, costs about $2,000 to $8,000, and system software includes real-time executive.

The maxi mini without memory costs about $10,000 to $40,000, and will accommodate large disks as well as terminals and printers, Hackborn said.

Sanders outlined his view of the computing spectrum, with costs from $5,000 to $1.5 million, and said the minicomputer overlies part of the range. "The end points it encompasses are not clear, however."

Sanders' concept of the universe begins at the low end with the programmable calculator, designed for a user with a budget of $5,000 to $25,000.

Next on the spectrum is a small business system ranging from $20,000 to $85,000 in price, which is a single-user system with RPG-II and has access to low-speed, low-cost peripherals.

Next is the small business computer priced at $50,000 to $250,000, which provides for multiple users and multiprogramming, Sanders said.

Languages include RPG-II and Cobol, and data base management capability is available.

In explaining the evolution of the minicomputer, Microdata Corp. President Donald N. Fuller said initially firms "tried to design a computer for as broad a range of applications as possible. We hung a lot of bells and whistles such as I/O, etc. on it that weren't really required for some of the applications for which we sold them."

Now, he observed, "the low end of the market, where we used to sell with an overkill, has gone to where it should have been in the first place, to a machine that could be stripped down and sell for $1,000 or $2,000 as a small system or dedicated instruments application" which is becoming micro territory."

The minicomputer is becoming more of a systems product, which fits into a system selling for an average price of $30,000, he said.

"The whole computer industry is going to become somewhat amalgamated. Then we'll see the low end of the general-purpose market being occupied by firms formerly known as minicomputer makers," and the low end will go to microprocessors, he said.

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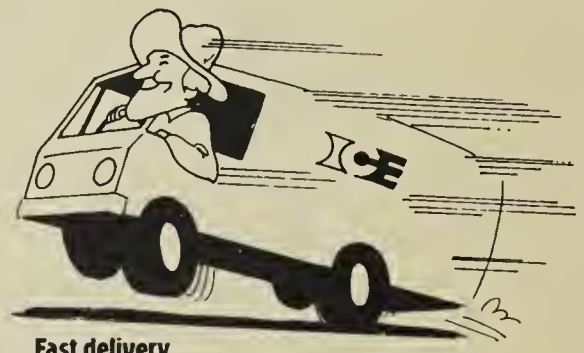

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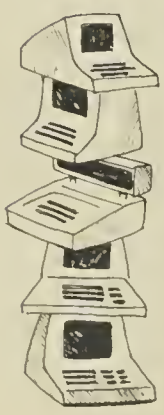

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Although Industry Rate Slower

Univac Sees 10% Annual U.S. Growth During 1975-80

BLUE BELL, Pa. – Univac should grow at an average annual rate of more than 10% in the U.S. and 15% in the overseas markets during the 1975-1980 period, ahead of what it projects as the rate for the computer industry as a whole, according to Gerald G. Probst, president of Univac.

"Our expectation for 1976 for the computer industry is for a continuation of the business climate similar to 1975 in line with the forecasts predicting a gradual upturn in the economy," Probst said.

During the past year the computer industry continued growing, although at a rate somewhat smaller than previously because of a generally lower pace of business activity, he added.

Computer marketing was not affected as severely as many other industries, and gross shipments by U.S. manufacturers for 1975 are expected to slip only slightly below the $11.2 billion value figure recorded in 1974, he said.

Probst said he expects Univac's revenues in calendar 1975 to climb 9% above those for calendar 1974.

Bookings are expected to increase more than 10% and the installed customer base to grow 15% over 1974, which was a record-breaking year in its own right, he noted. Translated into gross shipments, this will place Univac's performance ahead of the industry in general.

Good Year for Revenues

Univac had a very good year in which it improved revenue performance for the 13th straight fiscal year ended March 31, 1975, achieving a record of $1.3 billion.

This occurred despite the primary negative influences of inflation and recession which affected the computer industry's overall performance, Probst said.

In the product area orders for about 1,000 90/30 systems were received by the end of last year from customers around the world. "We are particularly gratified that 55% of the orders to date are from new customers," Probst remarked.

During 1975, Univac invested well over $100 million in R&D. "Because of the uncertainties in the economic climate, we have noticed computer users in the domestic and international markets are more cautious in committing themselves to capital outlays for new DP equipment or expansions to their existing systems," he observed.

However, computers are recognized by business and industry to be important tools in combatting constantly rising costs and in assisting companies to become more efficient in all phases of their operations, he said.

Although manufacturing is the largest single industry segment in the U.S. in terms of installed base of computers, this market area achieved limited growth in the past year because the general economic downturn apparently affected manufacturing to a greater degree than other industries.

"We anticipate this sector coming back stronger in 1976," he said.

Univac is optimistic that its contract with Aeroflot, the Soviet airline, for a $10 million reservation system presages further business opportunities in the USSR, Probst said.

During 1975 the U.S. State Department granted Univac a license to provide the computer system to Aeroflot.

Probst said he also expects joint ventures of the type Univac engages in with Saab-Scania will enable the firm to "contribute to, and participate more fully in, the international computer market."

Under the marketing and services joint venture, Saab-Univac is marketing Univac systems in Denmark, Finland, Norway and Sweden.

Univac also broadened its South American business by acquiring the Siemens general-purpose computer customer base in Brazil.

"In the individual industry markets we have enjoyed considerable success in the fast-growing sectors of state and local government, medical and printing and publishing," he said.

Overall, Univac expects the installed base of computers in the state and local government market to grow at a rate of more than 13% in the 1975-1980 period.

Univac has installed its Accuscan supermarket terminal in several sites and expects to realize a greater penetration of this industry in the coming months, he added.

The company is positioning itself through its terminal and communications capabilities to take advantage of opportunities afforded by the developing links between retail and bank systems for credit checking, check cashing authorization and electronic funds transfer, he said.

European Growth

Although Europe in general has suffered more from inflation than the U.S., Univac's European Division continues to grow somewhat more rapidly than the U.S. Some countries, notably Spain, achieved exceptional results despite the adverse economic factors, he observed.

Univac's Asia-Americas Division did well, with large government contracts in Australia and New Zealand. Japan has been especially impacted by the worldwide energy crisis, and escalating costs for oil have dampened expenditures for all capital equipment, Probst said.

Semicon/Europa '76 Slates Zurich Return Engagement

ZURICH – Reflecting the success of the first annual Semicon/Europa exhibition held here, the 1976 show will also be held in this city Oct. 19-21.

Over 1,800 attendees from 25 countries registered at the show.

The exhibit is sponsored by the Semiconductor Equipment and Materials Institute, Inc. (Semi), which also hosts shows on both the East and West Coasts of the U.S.

The organization is based at 625 Ellis St., Suite 212, Mountain View, Calif. 94043.

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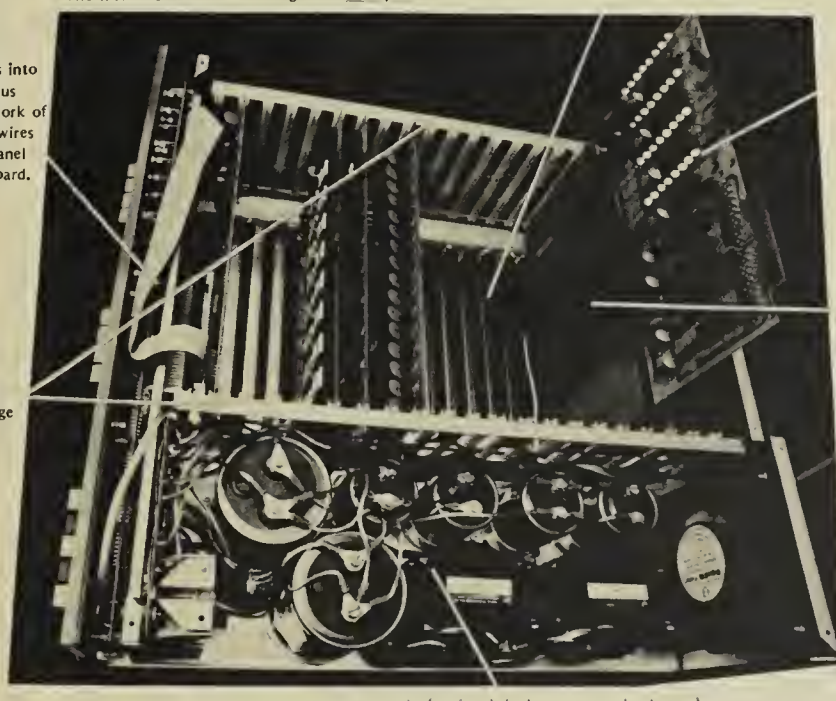

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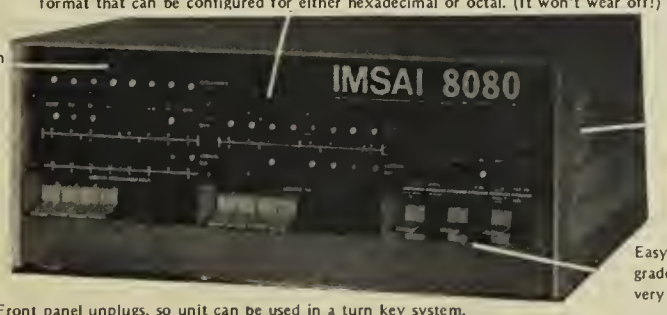

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Interdata Turns Attention to 16-Bit Line

By Molly Upton
Of the CW Staff

OCEANPORT, N.J. – "The days of winning a job on add time alone are gone," according to Dick Vivian, Interdata, Inc.'s sales manager for the 16-bit line.

"Software and other factors are more important," he said.

Although Interdata has been emphasizing its 32-bit "Megaminis," the firm recently introduced the 6/16, a 16-bit machine which is faster and less expensive than its previous offerings [CW, Nov. 26].

The 16-bit part of Interdata's business is mostly OEM, with about 60% OEM and 40% end-user business, Vivian said, although as a whole the company averages about 50%-50%.

In terms of revenues, the 32-bit line contributes about 55%, he added.

Vivian expects January to be a very good month because many customers were slow through last year "and these should be ready to pick up and run," he said.

Many companies which reduced personnel during the recession are now planning to expand DP functions, such as with automatic testing, he said.

Vivian admitted there will be a segment of the more traditional 16-bit OEM customers that will go to microprocessors, where neither power nor software is needed.

"But there will also be a shift back to minis from those who tried micros," he predicted.

Interdata has tried to provide flexibility to the OEM, Vivian said, as a means of reducing the OEM's costs.

For instance, the 6/16's package size is available with either eight slots and a 25- or 50 amp power supply or 16 slots with 50 amps, he said.

In addition, Interdata has unbundled 6/16 board sets to sell in OEM quantities.

The firm sells its software for a one-time charge, and there is no per-copy charge on each of an OEM's systems, Vivian said.

The "high degree of commonality" of parts allows Interdata to compete across the line, he said. For instance, the same disk controller is supplied with several models.

Each line item is discounted individually. If a customer buys 100 communications lines, for instance, he gets a discount on these, rather than on the amount of units of one CPU.

This discounting method enables Interdata to estimate future customer demand so it can be better suited to OEM volume requirements, Vivian observed.

Unidata Enterprise Reaches End, Siemens Left to Pick Up Pieces

AMSTERDAM, The Netherlands – Unidata, the consortium formed by three European firms to compete with IBM, has effectively given up the ghost.

The formal announcement of the dissolution of contracts came late last month after a series of events that had left the consortium all but dead.

Unidata was formed July 4, 1973 by Compagnie Internationale pour l'Informatique (CII), Philips and Siemens AG following negotiations that began on Feb. 1, 1972.

CII entered into a merger agreement last year with Honeywell Bull that effectively pulled it out of the sphere of interest with Unidata. Philips withdrew its large-scale Series P 1000 in September, but continues to market its small business system.

This left Siemens AG the only partner nominally active with a range of products.

However, when Siemens announced its large 7755 system, it was as a Siemens rather than a Unidata product.

The end of Unidata leaves Europe without a viable alternative to confront IBM, observers said.

A linkup between Siemens and International Compuers Ltd. (ICL) of Britain is seen as very unlikely because of incompatible product lines and political obstacles, they added.

Siemens reportedly has begun picking up the pieces and will continue to produce all products in the Unidata line and to lease and sell them where they were previously marketed by Unidata.

The final agreement disbanded all joint Unidata operations and provided for CII to service all Unidata 700 series in France and to service the Siemens 4000 series installations in France, according to reports.

Under the agreement, Siemens obtained production, service and marketing control of the former Unidata line except for the French service agreements.

In addition, CII and Siemens signed a pact under which CII will service new 7700 series installations in France leased or sold by Unidata.

Expansions

DG Leases HIS Quarters

SOUTHBORO, Mass. – Down with the Honeywell sign and up with the Data General sign at three buildings in Framingham is part of Data General Corp.'s (DG) expansion plans.

DG will use the leased buildings in the former Honeywell Systems (HIS) complex primarily as headquarters for national field engineering.

The firm has bought a 39,000 sq-ft building here adjacent to its other facilities for $400,000 and will use it for warehousing and its facility maintenance department.

In other moves, DG bought 74 acres in Westboro, Mass., on which it will construct a 300,000 sq-ft corporate headquarters buidling later this year.

In addition, DG has agreed to buy about 50 acres and a 105,000 sq-ft building complex in Portsmouth, N.H. The transaction is contingent upon a zoning change.

Other Moves

Beehive Medical Electronics, Inc. has opened a 4,000 sq-ft sales and service branch in Costa Mesa, Calif.

Memorex Corp. has opened a 34,000 sq-ft Eastern warehouse, distribution and service center in the King of Prussia, Pa. Industrial Park.

Wang Laboratories, Inc. has purchased an 81,000 sq-ft facility in the Northwest Industrial Park at the intersections of Routes 3 and 128 in Burlington, Mass.

Kustom Data Communications, Inc. has opened a facility to consolidate sales, software development and maintenance for its Western region in San Jose, Calif.

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Time Runs Out In Arson Charge Filed Against DG

SANTA MONICA, Calif. – The statute of limitations has expired on an investigation of criminal charges of arson filed against Data General Corp. (DG) by Keronix, Inc.

Civil charges filed by each firm against the other were not affected by the expiration.

Keronix, a maker of memories and minicomputers, accused DG of arson and other charges following a fire in its plant [CW, Jan. 22]. A federal grand jury conducted a criminal investigation until 1975, when the matter was handed over to a state grand jury.

Wang Labs Plans Stock Offering

TEWKSBURY, Mass. – Wang Laboratories, Inc. is planning to issue a limited voting class of common stock which would provide the company with a ready source of future equity capital, according to An Wang, the firm's president.

Issuing the new type of stock, for which approval is being sought at a special shareholders' meeting in March, would cause the firm to be eliminated from the New York Stock Exchange listing, he said.

Wang added he will apply for listing on the American Stock Exchange, whose rules don't prohibit this class of common stock.

Stockholders would be issued one share of Class B common for every four shares of common currently held.

Class B will pay a quarterly dividend of 5 cents a share, twice the rate currently paid on its common. Holders of the new stock will elect two of the company's seven directors and have 1/10 of a vote on other matters, Wang said.

Executive Corner

■ Allen J. Krowe has been elected a vice-president of IBM Corp., continuing his present responsibility as assistant group executive, plans and controls, at the Data Processing Product Group.

■ Kenneth W. Simonds was named vice-president of marketing for Amdahl Corp.'s Western and Canadian operations; James K. Dutton was appointed vice-president of marketing for Amdahl's Eastern operations.

■ Robert B. Louthan has been named vice-president of U.S. operations, Professional Services Division, and Robert L. Hennessy has been named vice-president of the Terminal Products Division of the peripheral products business at Control Data Corp.

■ Bruce Chrane, director of national sales at Prime Computer, Inc., has left the company as a result of restructuring in the marketing area. Regional sales managers and national accounts managers will now report directly to Bob Morrill, vice-president of marketing.

■ Richard T. Peters has been named vice-president of Business Systems Technology, Inc.

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B.A. in Business or Accounting and at least 5 years systems design in Business Applications. Experience with DB/DC a plus.

PROGRAMMER/ANALYST
3 to 5 years experience with ANS COBOL and project leader responsibility on at least one major system implementation. B.A. in Business or Accounting highly desirable.

PROGRAMMER
At least 2 years experience with ANS COBOL. RPG/II and/or ALC experience a plus.

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Salary range: $1437.60-$1888.60. Submit resume by 2/2/76 to: Bruce C. Brubaker, University of Minnesota, Duluth, 15 Administration, Duluth, Minnesota 55812. (218) 726-8544.

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Louisiana State University's Computer Research Center has an immediate opening for a Senior Systems Programmer. Candidates must have a Bachelor's or higher degree plus at least two years experience with IBM OS, MVT, and HASP. Preference will be given to those candidates with training in OS internals or who have worked in an OS maintenance capacity. Responsibilities will include generation and maintenance of Supervisory software, development of internal support programs, and user education. Experience in a Teleprocessing (TCAM/TSO) environment would be helpful. Please send confidential resume to:

Dr John M. Tyler
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Computer Research Center
Louisiana State University
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PROJECT LEADER

Hartford area corp seeks candidate with O/R bkgd with emphasis on economic analysis, math, modeling & statistics. Must come from insurance industry. Salary to $25K (fee paid). Contact Stan Durbas (in confidence).

ROBERT HALF PERSONNEL AGENCIES
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UNIV. COMPUTER CENTER DIRECTOR
No. Illinois Univ.

This is a key position directing the Computer Center operations of a large state-supported university. Reports to the Office of the Vice President and Provost.

Responsibilities

Administrative and technical direction of university computer facilities and personnel, serving both administrative and academic users. Coordination of university computing resource planning, including the establishment of priorities and the assessment of hardware and software acquisition alternatives. Development, justification and management of annual budget in excess of 1 million dollars.

Qualifications

A minimum of five years experience in progressively more responsible management positions in the field of data processing. At least two years work experience in a large university desired. Record of successful experience in evaluation and selection of hardware and software. Proven ability to communicate on both technical and nontechnical basis with univeristy computer users and computer department personnel. Baccalaureate degree and advanced degree or other appropriate career related education.

Facilities

The NIU Computer Center supplies computing resources on mixed vendor hardware and software to both administrative and academic users on an around the clock schedule. Present hardware includes an IBM 360/67 with 2.5 meg memory and 27 DASD. Operating with OS/MVT/HASP, teleprocessing to 3 RJE stations, and limited on-line service through 40 ports.

Applications and Nominations

Send all materials, resumes, letters, etc. to: Search Committee for Director of Computer Center Office of Vice President and Provost, Northern Illinois University, Dekalb, Ill. 60115. *An equal opportunity/affirmative action employer.*

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You will be the leader for researching relative effectiveness and efficiency of the integration of computer applications into the design, implementation and evaluation of curricula for the deaf. You will be responsible for departmental program planning and budgeting. You should have a Master's Oegree in Curriculum Development; Ooctorate preferred. 3-5 years management experience in business, industry, and/or education required. Experience with deafness preferred but not necessary.

ASSOCIATE EDUCATIONAL SPECIALIST – PRE-PROFESSIONAL PROGRAMS
You will manage pre-professional programs, curriculum development and teaching, monitor development education of deaf students and coordinate student-professional activities. You will also have research and planning duties. B.S. in Engineering, M.S. in Guidance or Industrial Psychology required. You should have background in industrial personnel relations, new employee training, engineering education and curriculum development.

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You will confer with managers and staff to define application problems, determine system specifications, design data processing procedures; prepare block diagrams illustrating the solutions, flowcharts for programming, forms design and some program coding. You will also analyze existing systems and programs and make decisions. You should have a Bachelor's, preferably in Computer Science or Business, and a minimum of 2 years in OP, COBOL, FORTRAN, APL, and previous design experience. You must be able to communicate with non-OP personnel.

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We have an immediate opportunity for a "shirt sleeves" manager to supervise the maintenance personnel, both hardware and software, for our on-line interactive computer system, which includes PDP-11's and 2314 type disks.

Applicants should have experience in the actual maintenance of this equipment and general understanding of disk operating systems, preferably DOS and RSX-11. In addition, formal education in electronics or computer science would be a plus.

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EXCITING CAREER OPPORTUNITIES IN DATA PROCESSING

Florida Power & Light Company, Florida's largest electric utility, has immediate openings in our data processing organization.

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Minimum of three years experience in IBM Operating System software (OS-MVT, OS-VS2) in a medium or large system environment. VS2 experience preferred.

PROGRAMMERS

Minimum of two years experience in programming using BAL, ANSI COBOL and/or Fortran IV in an IBM 360/370 environment. Bachelors Degree in Science, Engineering or Business preferred.

ANALYSTS

Minimum of two years experience in system analysis and design with five years total data processing experience. Bachelors Degree in Science, Engineering or Business preferred.

IMMEDIATE OPENINGS

Qualified applicants who wish to be considered for these positions should mail their resumé and salary requirements to:

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Responsible for the development of the major on-line, real time systems in financial areas; supervising 8-10 staff members.

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Responsibilities: Member of technical staff supporting all operating systems software development and maintenance.
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A senior level opening requiring a degree and 4-5 years experience in a sophisticated systems environment implementing state-of-the-art production systems. You will be responsible for feasibility studies, cost/benefits analysis, detailed presentations to management and system implementation.

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You'll be responsible for providing operating systems support and guidance in the creation of standards for an OS/VS1 environment. This will include systems generation and maintenance of OS/VS1, VM, installation and maintenance of vendor supplied software and telecommunication expertise in support of RJE and on-line systems using IBM 2922, 3704, 3270 and System 7. Oualifications include an indepth knowledge of OS/VS1 operating systems, knowledge of telecommunications concepts and techniques and programming expertise using BAL, ANS COBOL and PL1. A minimum of 5 years experience is required.

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United, the world's largest airline has immediate openings for experienced programmer analysts. Here is an opportunity for programmer analysts to become part of the team that runs one of the country's finest airline data processing systems. This position will challenge you to develop system-wide financial applications on our IBM system 370 series computers.

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to supervise activities for support of Operating System Software.

Senior Systems Programmer-

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Eight to Ten years in data processing with demonstrated project leader responsibility in a variety of application areas. Thoroughly familiar with the information needs of management, problem analysis, project management and control techniques.

SYSTEMS ANALYST
Minimum of six years work experience in a manufacturing company, four of which must have been in data processing as a programmer analyst or systems analyst. Trained in systems analysis with special emphasis in project management, user relations, data gathering techniques, written and oral communications and management information systems.

SENIOR PROGRAMMER ANALYST
Minimum of four years experience in programming. Proficient in job control as well as three programming languages. Trained in systems analysis and design techniques with special emphasis in data base design and business methods.

Submit confidential resuem, including salary history, by January 30, to:

Industrial Relations, Star Manufacturing Company, P.O. Box 94910, Oklahoma City, OK. 73109 *an equal opportunity employer.*

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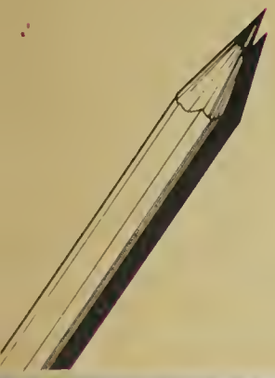

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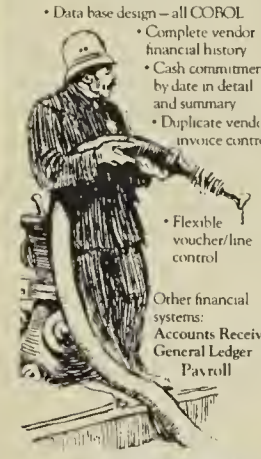

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MAI Realizes 115% Earnings Gain in '75

NEW YORK – Management Assistance, Inc. (MAI) reported record revenues and earnings for the fourth quarter and for the year ended Sept. 30.

Revenues and earnings for 1975 exceeded those of 1974, the previous record year, by 23% and 115%, respectively.

Earnings for the year jumped to $6.1 million or 20 cents a share including an extraordinary credit of $2.1 million on revenues of $94.5 million. This compared with last year's earnings of $2.8 million or 10 cents a share after an extraordinary credit of $1.8 million with revenues of $76.6 million.

Fourth-quarter revenues rose 22% while earnings jumped 72% over those of the previous year ago quarter.

Earnings for the quarter reached $2 million or 7 cents a share, including a $1.2 million special credit, compared with $1.2 million, including a $633,000 special credit, in the same period last year.

Revenues rose to $25.4 million compared with $20.8 million in the same 1974 period.

"The penetration of the small business computer market by our subsidiaries, Basic/Four Corp. and MAI International Corp., continues," Raymond P. Kurshan, MAI president, reported.

"Worldwide sales of the Basic/Four computer increased to $42.6 million in fiscal 1975, 48% over last year. Our current backlog of more than $17 million for Basic/Four computers is also at a record high," he said.

"Revenues from our third-party maintenance and equipment refurbishing activities [Sorbus, Inc.] also increased," he continued.

Total service revenues rose to $30.7 million, an increase of 52% from last year.

Genesis One Computer Corp.'s cash flow from the rental and sale of unit record and other DP equipment provided funds to reduce its secured and noteholder debt by $3 million to $13.3 million at the end of fiscal 1975. Since 1970, that debt has been reduced by $47 million, Kurshan said.

During the year MAI showed improvement each quarter over the prior year, despite the second quarter write-off of $1.1 million due from Potter Instrument Co. Inc., he observed.

"Looking ahead, we expect the continuation in 1976 of the trend of improved profits and revenues which MAI has experienced during the last two years," he concluded.

Data 100 Bracing for Quarter Dip Attributed to Lower Order Rate

MINNEAPOLIS – Data 100 Corp. expects its first down quarter in three years as a result of lower than expected orders and shipments, according to Edward D. Orenstein, the firm's president.

Earnings per share for the fourth quarter will decline by about 50% compared with figures of 29 cents a share in the year-ago period, he indicated in a letter to stockholders.

Fourth-quarter results will include about $3 million of non-recourse third-party equipment sales, the first of this type this year, compared with about $16 million during the entire year in 1974.

Despite the anticipated decline in fourth-quarter results, the firm expects to achieve two of its major objectives for the full year 1975, he stated: a substantial rise in earnings and total revenues of nearly $100 million compared with $70 million in 1974.

However, he remarked, per-share earnings will be about equal or down from last year's 85 cents a share, based on an increase of nearly 600,000 outstanding shares as a result of two acqusitions.

Orenstein declined to make specific revenue and earnings projections for 1976 "because of the uncertain nature of the months ahead."

Codex Expecting Drop

NEWTON, Mass. – Codex Corp. expects current quarterly revenues and income to be below those of the comparable period last year.

First-quarter revenues and resultant income are being impacted by temporary factors such as the introduction of the firm's new products and the startup of a manufacturing facility, according to Arthur Carr, Codex president.

The company expects to be on plan for the full fiscal year.

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Earnings Reports

MICRODATA
Three Months Ended Nov. 30

	1975	1974
Shr Ernd	$.25	.....
Revenue	4,902,033	$3,441,735
Earnings	413,817	(1,581,426)

MICROFORM DATA SYSTEMS
Three Months Ended Oct. 31

	1975	a1974
Shr Ernd	$.11	$.05
Revenue	5,737,781	3,604,521
Tax Cred	288,880	123,497
Earnings	601,833	257,288

a-Restated to reflect accounting change for R&D costs.

APPLIED MAGNETICS
Year Ended Sept. 30

	1975	1974
Shr Ernd	$.21	.....
Revenue	62,338,878	$62,639,519
Earnings	895,043	(204,887)
3 Mo Shr	.09	.04
Revenue	15,403,878	19,069,519
Earnings	393,043	176,113

WALLACE BUSINESS FORMS
Three Months Ended Oct. 31

	1975	1974
Shr Ernd	$.57	$.52
Revenue	17,758,000	15,297,000
Earnings	1,116,000	961,000

COMPUTER INVESTORS GROUP
Three Months Ended Sept. 30

	1975	a1974
Shr Ernd	$.37	.....
Revenue	7,126,037	$8,010,808
Earnings	808,287	(524,433)
6 Mo Shr	.49	.....
Revenue	14,339,956	14,495,729
Earnings	1,072,643	(1,163,702)

a-Restated.

HEWLETT-PACKARD
Year Ended Oct. 31

	1975 (000)	1974 (000)
Shr Ernd	$3.04	$3.08
Revenue	982,703	884,053
Earnings	83,957	84,022
3 Mo Shr	.77	.94
Revenue	276,447	244,880
Earnings	21,306	26,030

BRADFORD COMPUTER & SYSTEMS
Three Months Ended Sept. 30

	1975	a1974
Shr Ernd	$.23	$.20
Revenue	16,247,000	13,075,000
Spec Item	79,000	(44,000)
Earnings	946,000	828,000
9 Mo Shr	.77	.67
Revenue	50,663,000	42,448,000
Spec Cred	89,000	7,000
Earnings	3,125,000	2,735,000

a-Restated.

INCOTERM
Three Months Ended Nov. 22

	1975	1974
Shr Ernd	%.30	$.18
Revenue	8,332,000	5,928,000
Earnings	612,000	373,000
9 Mo Shr	.95	.....
Revenue	23,944,000	13,996,000
Spec Cred	193,000	.....
Earnings	1,910,000	(298,000)

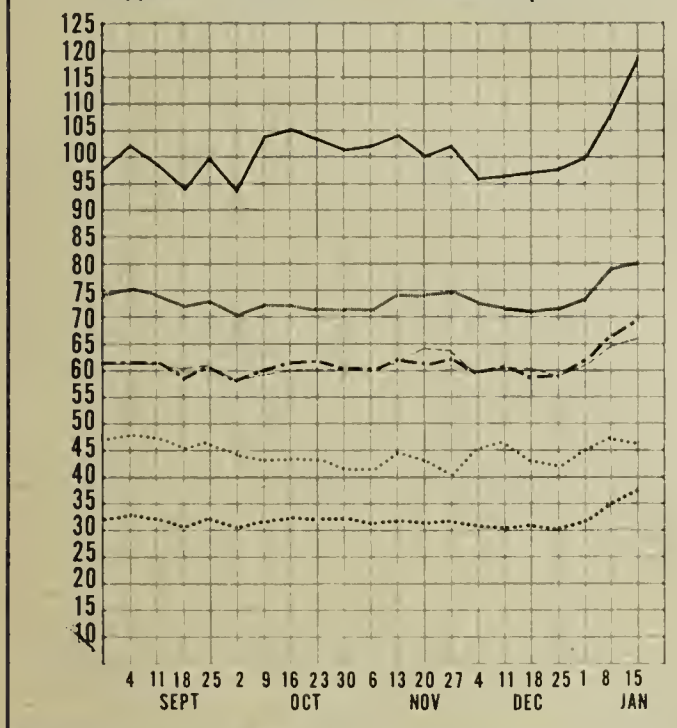
QUANTOR
Three Months Ended Oct. 31

	1975	1974
Shr Ernd	$.04	$.05
Revenue	3,449,000	2,819,000
Tax Cred	57,000	58,000
Earnings	119,000	128,000

RECOGNITION EQUIPMENT
Year Ended Oct. 31

	1975	1974
Shr Ernd	$.58	$.39
Revenue	59,254,000	42,913,000
Tax Cred	1,213,000	1,656,000
Earnings	3,374,000	2,087,000
3 Mo Shr	.22	.13
Revenue	16,777,000	14,290,000
Tax Cred	248,000	707,000
Earnings	1,282,000	724,000

COMPUTERWORLD Computer Stocks Trading Indexes



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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JANUARY 14, 1976

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COMPUTER SYSTEMS

EXCH		1975-76 RANGE (1)	CLOSE JAN 14 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	92 7/8	+8 1/8	+9.5
O	COMPUTER AUTOMATION	2- 13	13 1/8	+1 7/8	+16.6
N	CONTROL DATA CORP	11- 23	21	+1 5/8	+8.3
N	DATA GENERAL CORP	10- 44	44	+ 7/8	+2.0
O	DATAPOINT CORP	6- 27	26 3/4	0	0.0
D	DIGITAL COMP CONTROL	1- 4	1 3/4	0	0.0
N	DIGITAL EQUIPMENT	46-158	157 3/4	+15	+10.5
N	ELECTRONIC ASSOC.	2- 3	2 3/8	0	0.0
A	ELECTRONIC ENGINEER.	5- 10	8 1/2	+ 5/8	+7.9
N	FCX8DPO	23- 42	32 5/8	+2 5/8	+8.7
O	GENERAL AUTOMATION	4- 14	7 1/2	+1 1/4	+20.0
O	GRI COMPUTER CORP	1- 1	5/8	+ 1/8	+25.0
N	HEWLETT-PACKARD CO	58-120	106 3/4	+7 1/2	+7.5
N	HONEYWELL INC	22- 40	39 3/8	+4 1/8	+11.7
N	IBM	158-241	241 1/4	+12 3/4	+5.5
O	MEMOREX	1- 10	8 1/4	- 1/4	-2.9
O	MICRODATA CORP	2- 11	11 3/8	+1 3/4	+18.1
O	MODULAR COMPUTER SYS	5- 19	10 1/4	+1 1/4	+13.8
N	NCR	15- 39	28 3/8	+1 3/4	+6.5
O	PRIME COMPUTER INC	2- 6	4 3/4	0	0.0
N	PERKIN-ELMER	16- 30	21 3/4	- 3/8	-1.6
N	RAYTHEON CO	26- 59	50 1/2	+4	+8.6
N	SINGER COMPANY	9- 17	11 1/2	+1 7/8	+19.4
N	SPERRY RAND	26- 49	42 1/2	+1 3/4	+4.2
D	SYCOR INC	5- 23	22 1/2	+1 3/4	+8.4
A	SYSTEMS ENG. LABS	1- 7	6 3/8	+ 3/8	+6.2
N	VARIAN ASSOCIATES	7- 18	13 3/8	+ 3/8	+2.8
N	WANG LABS.	7- 17	12 1/2	+1 1/8	+9.8
N	XEROX CORP	47- 86	57 3/8	+4 5/8	+8.7

LEASING COMPANIES

EXCH		1975-76 RANGE (1)	CLOSE JAN 14 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMDISCO INC	1- 5	3 3/8	0	0.0
A	COMMERCE GROUP CORP	2- 4	2 5/8	+ 1/4	+10.5
A	COMPUTER INVSTRS GRP	1- 2	3/4	0	0.0
M	DATRONIC RENTAL	1- 1	1/4	0	D.D
A	DCL INC	0- 1	3/8	0	0.0
N	DPF INC	3- 6	5 1/2	+ 1/2	+10.0
O	EDP RESOURCES	1- 2	3/4	- 1/4	-25.0
A	GRANITE MGT	1- 5	4 1/2	D	D.D
A	GREYHOUND COMPUTER	2- 3	2 3/4	- 1/4	-8.3
N	ITEL	3- 9	7 1/4	+ 3/4	+11.5
N	LEASCO CORP	4- 8	7 3/4	+ 7/8	+12.7
D	LEASPAC CORP	1- 1	1/4	D	D.D
O	LECIRO MGT INC	1- 1	1/8	D	D.D
O	NRG INC	0- 4	1/8	- 1/4	-66.6
A	PIONEER TEX CORP	2- 7	6 5/8	D	D.D
A	ROCKWOOD COMPUTER	1- 1	1/8	0	D.D
N	U.S. LEASING	7- 14	9 1/4	+1 3/4	+23.3

SOFTWARE & EDP SERVICES

EXCH		1975-76 PANGE (1)	CLOSE JAN 14 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 1	1	+ 1/4	+33.3
A	APPLIED DATA RES.	1- 10	1 1/2	- 1/8	-7.6
N	AUTOMATIC DATA PROC	29- 65	60	+1 5/8	+2.7
D	BRANDON APPLIED SYST	1- 1	1/8	D	D.D
O	COMPUTER DIMENSIONS	2- 6	3	+ 3/8	+14.2
O	COMP ELECTION SYSTMS	3- 7	6 1/4	+ 3/4	+13.6
O	COMPUTER HORIZONS	1- 1	1/2	0	0.0
O	COMPUTER NETWORK	1- 3	2 1/4	- 1/4	-10.0
N	COMPUTER SCIENCES	2- 6	4 3/4	+ 1/2	+11.7
O	COMPUTER TASK GROUP	1- 1	3/4	0	D.D
O	COMPUTER USAGE	2- 4	3 1/4	+ 1/8	+4.0
O	COMSHARE	2- 4	2 1/4	+ 1/8	+5.8
D	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	14 1/2	+ 5/8	+4.5
O	INFONATIONAL INC	1- 1	1/8	- 1/8	-50.0
D	IPS COMPUTER MARKET.	1- 1	5/8	0	0.0
O	KEANE ASSOCIATES	2- 3	2 3/8	+ 1/8	+5.5
O	KEYDATA CORP	2- 4	2 7/8	0	0.0
D	LOGICON	3- 5	4 1/8	+ 1/4	+6.4
A	MANAGEMENT DATA	1- 3	1 1/2	- 1/4	-14.2
A	NATIONAL CSS INC	6- 15	15	+1 1/8	+8.1
D	NATIONAL COMPUTER CO	1- 1	1/8	0	D.D
A	ON LINE SYSTEMS INC	8- 17	15	0	D.D
N	PLANNING RESEARCH	2- 6	3 1/2	+ 1/8	+3.7
O	PROGRAMMING & SYS	1- 1	1/2	D	D.D
D	RAPIDATA INC	2- 5	3 1/4	- 1/4	-7.1
D	REYNOLDS & REYNOLD	10- 24	16 1/2	+2 3/4	+20.D
O	SCIENTIFIC COMPUTERS	1- 1	3/4	+ 1/8	+20.0
D	SIMPLICITY COMPUTER	1- 1	1 1/8	0	D.D
D	TYMSHARE INC	7- 23	22 1/8	+ 3/4	+3.5
A	URS SYSTEMS	2- 4	2 7/8	0	0.0
N	WYLY CORP	2- 4	2 1/2	- 1/8	-4.7

PERIPHERALS & SUBSYSTEMS

EXCH		1975-76 PANGE (1)	CLOSE JAN 14 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-HULT	4- 9	8 5/8	+ 3/8	+4.5
O	ADVANCED MEMORY SYS	1- 7	7	+2 1/4	+47.3
N	AMPEX CORP	3- 7	6	+1	+20.D
D	ANDERSON JACOBSON	1- 3	2	+ 1/8	+6.6
O	BEEHIVE MEDICAL ELEC	1- 5	3 1/2	+ 1/4	+7.6
A	BOLT,BERANEK & NEW	5- 13	7	- 3/8	-5.0
N	BUNKER-RAMO	4- 8	4 7/8	- 1/4	-4.8
A	CALCOMP	3- 7	4 1/8	+ 1/8	+3.1
D	CAMBRIDGE MEMORIES	1- 5	1 3/4	- 1/8	-6.6
N	CENTRONICS DATA COMP	7- 25	21 7/8	+1 1/2	+7.3
O	CODEX CORP	15- 38	22 1/4	-1 3/4	-7.2
O	COGNITRONICS	1- 2	1	+ 1/4	+33.3
O	COMPUTER COMMUN.	1- 2	1 1/8	+ 1/4	+28.5
O	COMPUTER CONSOLES	3- 7	4 3/4	+ 1/4	+5.5
A	COMPUTER EQUIPMENT	1- 2	1 3/8	- 1/8	-8.3
D	COMPUTER MACHINERY	1- 2	1 1/8	+ 1/8	+12.5
D	COMPUTER TRANSCEIVER	1- 2	3/4	D	D.D
D	COMTEN	2- 5	4 1/8	+ 1/4	+6.4
N	CONRAC CORP	12- 30	23 1/4	D	D.D
D	DATA ACCESS SYSTEMS	1- 3	1 3/4	- 1/4	-12.5
D	DATA 100	5- 16	7 5/8	+ 1/8	+1.6
A	DATA PRODUCTS CORP	2- 6	5 5/8	+ 5/8	+12.5
D	DATA TECHNOLOGY	1- 3	1 1/2	+ 1/4	+20.0
D	DATUM INC	1- 2	1 1/8	+ 1/8	+12.5
D	DECISION DATA COMPUT	2- 7	3 5/8	+ 3/4	+26.0
D	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
D	DIVAN CONTROLS	1- 1	1/2	0	0.0
N	ELECTRONIC M & H	1- 3	1 1/2	0	0.0
O	FABRI-TEK	1- 1	5/8	0	0.0
D	GENERAL COMPUTER SYS	1- 2	2	0	0.0
N	HAZELTINE CORP	3- 6	4 3/4	+ 3/4	+18.7
N	HARRIS CORP	18- 36	36	+ 5/8	+1.7
A	INCOTERM CORP	3- 12	9 3/8	+ 1/4	+2.7
D	INFOREX INC	2- 5	3 1/2	+ 3/8	+12.0
O	INFORMATION INTL INC	8- 14	10 5/8	- 1/8	-1.1
A	LUNDY ELECTRONICS	3- 7	6 3/8	+ 3/8	+6.2
D	MANAGEMENT ASSIST	1- 1	3/4	- 1/8	-14.2
A	MILGO ELECTRONICS	8- 24	17 5/8	+ 7/8	+5.2
N	MOHAWK DATA SCI	1- 5	3 3/8	+ 1/8	+3.8
D	OPTICAL SCANNING	1- 3	1 1/2	0	0.0
O	PENRIL CORP	1- 2	1 1/2	+ 1/4	+20.0
O	PERTEC CORP	2- 8	4	+ 1/4	+6.6
A	POTTER INSTRUMENT	2- 2	1 3/4	0	D.D
O	PRECISION INST.	1- 1	3/8	+ 1/8	+50.0
O	QUANTOR CORP	2- 6	4 3/8	+ 3/8	+9.3
D	RECOGNITION EQUIP	2- 9	6	+ 1/8	+2.1
N	SANDERS ASSOCIATES	3- 11	7 1/8	- 1/8	-1.7
D	SCAN DATA	1- 3	2 3/4	+ 1/8	+4.7
D	STORAGE TECHNOLOGY	6- 17	10 7/8	- 3/8	-3.3
D	T BAR INC	3- 6	5 3/4	0	0.0
O	TALLY CORP.	1- 5	4	0	0.0
O	TEC INC	1- 4	2 1/2	0	0.0
N	TEKTRONIX INC	18- 50	49 7/8	+ 7/8	+1.7
N	TELEX	1- 3	2 1/2	+ 1/8	+5.2
O	WANGCO INC	4- 12	11 1/2	- 1/4	-2.1
D	WILTEK INC	1- 4	1 1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		1975-76 PANGE (1)	CLOSE JAN 14 1976	WEEK NET CHNGE	WEEK PCT CHNGE
D	BALTIMORE BUS FORMS	4- 5	4 1/2	0	D.D
A	BARRY WRIGHT	5- 7	6	+ 1/8	+2.1
D	CYBERMATICS INC	0- 1	3/8	D	D.D
A	DATA DOCUMENTS	29- 42	33	- 7/8	-2.5
D	DUPLEX PRODUCTS INC	12- 25	20	- 1/8	-0.6
N	ENNIS BUS. FORMS	5- 7	5 7/8	- 1/8	-2.0
D	GRAHAM MAGNETICS	5- 10	8 1/2	- 1/2	-5.5
O	GRAPHIC CONTROLS	8- 21	14 3/4	+1 3/4	+13.4
N	3M COMPANY	43- 68	60 1/8	+2 1/8	+3.6
D	MOORE CORP LTD	39- 51	49 1/4	+1 3/4	+3.6
N	NASHUA CORP	9- 22	11 7/8	+ 3/8	+3.2
D	STANDARD REGISTER	11- 20	15 3/4	- 1/2	-3.0
D	TAB PRODUCTS CO	4- 8	6	+ 1/2	+9.0
N	UARCO	17- 24	21	- 3/4	-3.4
O	VANIER GRAPHICS CORP	4- 7	5 1/4	+ 1/4	+5.0
A	WABASH MAGNETICS	3- 5	4 3/4	+ 3/8	+8.5
N	WALLACE BUS FORMS	15- 25	19 5/8	+ 1/2	+2.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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